CALENDAR

OF THE

SCHOOL OF MINING

A COLLEGE OF APPLIED SCIENCE
(Affiliated to Queen's University)

KINGSTON, ONTARIO

EIGHTEENTH SESSION

1910-'11

This Calendar is for the use of those intending to take a course in Applied Science, including all courses in Engineering.

For *Arts* and *Theology* Calendar write Geo. Y. Chown, B.A., Kingston, Ont.

For *Medical* Calendar write Dr. A. R. B. Williamson, Kingston, Ontario.

The *Educational Courses,* under agreement with the Ontario Education Department, are accepted as the professional courses for (*a*) First Class Public School Certificate; (*b*) High School Assistant's Interim Certificate, and (*c*) Specialist's Interim Certificate. For Calendar write George Y. Chown, B.A., Kingston, Ontario.

For lists of graduates, students, scholarships and prizes and pass lists, all Faculties, see Queen's University complete Calendar.

The Complete Calendar and the Examination Papers, all Faculties, will be issued in July. Thereafter copies, twenty-five cents for Calendar (by post 12 cents extra) and fifty cents for Examination Papers (by post 12 cents extra) may be had on application to the Registrar, George Y. Chown, B.A., Kingston, Ontario, to whom all enquiries for information and letters regarding Arts, Science, Education and Theology courses should be addressed.

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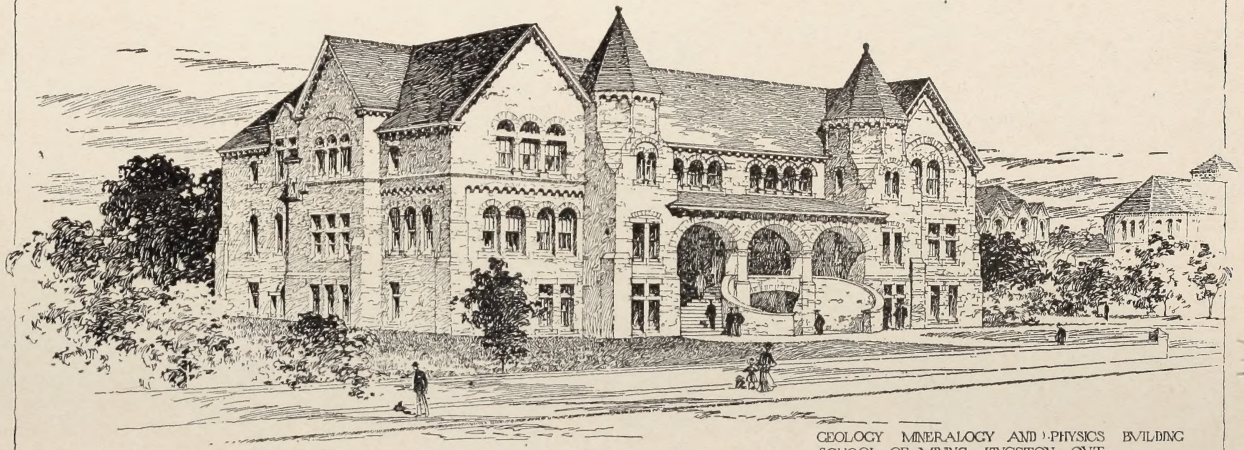
KINGSTON:
The Jackson Press
1910.



GEOLOGY MINERALOGY AND PHYSICS BUILDING
SCHOOL OF MINING KINGSTON ONT.
SYMONS & RAE ARCHITECTS TORONTO.

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VISITOR.

HON. J. M. GIBSON ..... Lieutenant-Governor of Ontario

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Vice-Chairman ..... D. M. McINTYRE, B.A., K.C.

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D. A. GIVENS, B.A. ..... } Appointed by the City Council

W. G. MILLER, B.A., LL.D. ..... Toronto
R. V. ROGERS, K.C., LL.D. ..... Kingston } Appointed by
H. W. RICHARDSON ..... Kingston Ont. Govt.
T. W. NASH ..... Kingston

CALENDAR.

1910.

June 28.—Matriculation examinations begin at University and every Collegiate Institute and High School in Ontario.

Sept. 1—Applications, stating subjects and accompanied by fee, for Supplemental Pass or Matriculation examinations to be made to the Registrar.

" 2—Engineering Field Work I and Shop Work for Courses F and G begin.

" 13—Supplemental Pass Examinations begin.

" 15—Matriculation Examinations begin.

" 28—Classes open (1st term).

Oct. 16—University Day.

Dec. 22—Christmas Holidays begin.

1911.

Jan. 4—Classes re-open (2nd term).

Mar. 1—Holiday (Ash Wednesday).

Mar. 29—Class work closes.

Apr. 3—Examinations begin.

" 24—Meeting of Faculty to consider reports of examiners.

" 26—Convocation for distributing prizes, announcing honours and laureating graduates.

TIME TABLE—FIRST YEAR.

	VIII.	IX.	X.	XI.	XII.	I.	II.	III.	IV.
Mon.	Jr. English A.B.C. Phys. Drill E.F.	Math. I.	Jr. English D.E.F.	Math. I.		Phys. I. Lab. A.B. Draw. I. D.E.F.	Phys. I. Lab. A.B. Draw. I. D.E.F.	Draw. I. A.B.C.D.E.F.	
Tues.	Jr. English D.E.F. Phys. Drill A.B.	Math. I.	Phys. I.	Math. I.		Gen. Ch. I.Lab. D.E.F. Jr. English A.B.C.	Gen. Ch. I.Lab. D.E.F. Draw. I. A.B.C.	Gen. Ch. I.Lab. D.E.F. Draw. I. A.B.C.	
Wed.	Jr. English D.E.F. Phys. Drill A.B.	Math. I.	Phys. I.	Gen. Chem. I.		Phys. Lab. C.D.	Phys. I. Lab. C.D.	Math. I. (b) (Astronomy)	
Thurs.	Jr. English A.B.C. Phys. Drill E.F.	Math. I.	Phys. I.	Gen. Chem. I.		Gen. Ch. I.Lab. A.B.C. Jr. English D.E.F	Gen. Ch. I.Lab. A.B.C. Draw. I. D.E.F.	Gen. Ch. I.Lab. A.B.C. Draw. I. D.E.F.	
Fri.	Jr. English A.B.C.	Math. I.(a) Survey I.(b)	Phys. I.	Math. I.		Phys. I. Lab. E.F. Draw. I. A.B.C.	Phys. I. Lab. E.F. Draw. I. A.B.C.	Phys. Drill C.D.	Faculty Lecture and Engineering Society.
Sat.	Phys. Drill C.D.								

(a) Denotes First Term. (b) Denotes Second Term. A.B.C.D.E.F. Denote Sections of the Class.

TIME TABLE—SECOND YEAR.

	VIII.	IX.	X.	XI.	I.	II.	III.	IV.
Mon.	Phys. II. ADEFGHJ Min. II. (a) B.C.	Survey II. E.J. Physics III. B.G. Biology C.	Math. II.	Gen. Eng. I. D.E.F.G.H.J. Min. I. A.B.C.	Anal.Chem.II. B.C.D. Draw. II. A.	Anal.Chem.II. B.C.D. Draw. II. A. Surv. III. E.J.	Draw. II. A. Surv. III. E.J. Phys. II. D.H.F.G.	Surv. III. E.J. Phys. II. D.H.F.G.
Tues.	Math. III.	Geology I. A.B.C.E.H.J.	Math. II.	Min. II. (a) B.C. Min. III. (b) A.C. Anal. Chem. I. D.E.F.G.H.J.	Anal. Chem. I. D.E.F.G.H.J. Anal Chem.IV B.C.	Anal. Chem. I. D.E.F.G.H.J. Worksh. I. A. Anal Chem.IV B.C.	Phys. II. E.J. Worksh. I. A. Phys. III. B.G.	Phys. II. E.J. Worksh. I. A. Phys. III. B.G.
Wed.	Math. III.	Anal. Chem. III. A.B.D. Mech. Eng. VII. F. Biology C.	Anal. Chem. III. A.B.C. Mech. Eng. VII. F. Min. V. (a) D.E.H.J.	Anal. Chem. III. A.B.C.D. Mech. Eng. VII. F. Survey. II. E.J.	Phys. II. ADEFGHJ AnalChem.III C.	Surv. VI. A.C. Worksh. I. E.J. Draw. III. D.F.G.	Surv. VI. A.C. Worksh. I. E.J. Draw. III. D.F.G.	Surv. VI. A.C. Worksh. I. E.J. Draw. III. D.F.G.
Thurs.	Phys. Ch. I. A.B.C.D.H.	Gen. Eng. I. D.E.F.G.H.J. Survey VI. A.C.	Math. II.	Desc. Geom. A.E.F.G.J. Org. Chem. I. B.D.H.	Min. II. (a) B.C. Min. III. (b) A.C.	Geol. I. A.B.C.E.H.J.	Des. Geom. A.E.J. Org. Chem. I. B.D.H. Elec. Eng.I. G	Des. Geom. A.E.J. Org. Chem. I. B.D.H. Elec. Eng.I. G
Fri.	Math. III.	Drawing II. E.J. Biology C.	Drawing II. E.J. Blowpiping A.B.C.	Drawing II. E.J. Blowpiping A.B.C.	Surv. II. E.J. Anal. Chem. I. A.B.C. AnalChem.III D.	Surv. II. E.J. Anal. Chem. I. A.B.C. Des. Geom. F.G.	Surv. II. E.J. Anal. Chem. I. A.B.C. Des. Geom. F.G.	Engineering Society Meeting.
Sat.	Anal ChIV (b) B.C.	Anal. Chem. IV.(b) B.C. *Phys. II. A Worksh. I. E. Draw. II. D.F.G.J.	Anal. Chem. IV. (b) B.C. *Phys. II. A Worksh. I. E. Draw. II. D.F.G.J.	Anal. Chem. IV. (b) B.C. *Phys. II. A Worksh. I. E. Draw. II. D.F.G.J.				

*Min. Geol. Excursions or work in Museum to Nov. 27th, A.B.C. After that date Physics II.

TIME TABLE—THIRD YEAR.

	VIII.	IX.	X.	XI.	I.	II.	III.	IV.
Mon.	Anal. Ch. V. C. Ore Dressing. A.B.	Anal. Ch. V. C. Elec. Eng. I. A.B.E.F.J.	Geol. IV. (a) A.C. Geol. II. (b) C. Phys. IV. G. Phys. Ch. II. D.	Mch. Eng. IV. F. Gen. Eng. I. A. Phys. Ch. II. B.C.D. Elec. Eng. II. G.J.	Phys. Ch. II. B.C.D.	Phys. Ch. II. B.C. Anal. Ch. VII H. Gen. Eng. II. D.E.F.G.J.	Physics IV. G. Anal. Ch. VII E.J.H. Ind. Chem. I. B.D. Anal. Ch. V. C.	Physics IV. G. Anal. Ch. VII E.J.H. Min. IV. B.C. Anal. Ch. IV. D.
Tues.	Min. IV. A.B.C.	Thermo. I.(a) A.D.E.F.G.J. Thermo.II(b) D.E.F.G.J.	Hyd. Eng. I. E.H.J. Geol. III. A.C.	Metal. I. A.B.D.E.F.G.	Min. IV. A.B.C. Ind. Ch. II. F.	Min. IV. A.B.C. Surv. V. E. Mch. Eng. I. D.F.G.	Anal. Ch. VI. B.C. Surv. V. E. Mch. Eng. III F. Elec. Eng. III G.	Anal. Ch. VI. B.C. Surv. V. E. Mch. Eng. III F. Elec. Eng. III G.
Wed.	Metal. I. A.B.D.E.F.G.	Mch. Eng.VII A.D.E.F.G.J.	Gen. Eng. II. D.E.F.G.J. Geol. II. (a) A.B.C. Geol. V. (b) A.C.	Mch. Eng. II. D.F.G.J. Mining I. A.C.	Mch. Eng. III F. Anal. Ch. IV. D. Phys. IV. G. Struc. Eng. I. E.F.J. Min. IV. A.B.C.	Mch. Eng. III F. Anal. Ch. IV. A.D. Phys. IV. G. Ry. Eng. I. E Org. Ch. II. B.	Mch. Eng. III F. Anal. Ch. IV. A.D. Phys. IV. G. Ry. Eng. I. E. Org. Ch. II. B.	Mch. Eng. III F. Anal. Ch. IV. D. Anal. Ch. VII E.J. Org. Ch. II. B.
Thurs.	Anal. Ch. V. D. Mining I. (b) A.C.	Anal. Ch. V. D. Rail. Eng. I. E. Gen. Eng. I. A. Org. Chem. II B. Elec. Eng. II. G.	Anal. Ch. V. D. Hyd. Eng. I. E.H.J. Geol. III. A.C.	Anal. Ch. V. D. Elec. Eng. II. G.J. Mch. Eng. IV F. Ore Dressing A.B. Gen. Eng. II. E.	Gen. Eng. III D.E.F.G.J. Anal. Ch. V. B.C.	Gen. Eng. III D.E.F.G.J. Anal. Ch. V. B.C.	Surv. IV. E. Surv. VII. A. Ind. Chem. I. B.D. Anal. Ch. V. C.	Surv. IV. E. Surv. VII. A. Anal. Ch. V. D.

(a) Denotes First Term. (b) Denotes Second Term. A.B.C.D.E.F.G.H.J. Denotes Courses,

TIME TABLE—THIRD YEAR (*Continued*).

	VIII.	IX.	X.	XI.	I.	II.	III.	IV.
Fri.	Mining I. (a) A.C. Phys. Ch. II. B.C.D.	Thermo. I.(a) A.E.F.G.J. Anal. Ch. VI. B.C. Elec. Eng. I. (b) A.D.E.F.J.	Ry. Eng. I. E. Mch. Eng. II. D.F.G.J. Geol. IV. (a) A.C. Geol. II. (b) C. Anal. Ch. VI. B.	Mch. Eng. I. D.F.G. Surv. VII. A. Surv. IV. E. Anal. Ch. VI. B.C.	Str. Eng. I. E.F.J. Mch. Eng. III D. Anal. Ch. IV. A. Anal. Ch. V. B. Elec. Eng. III G. Anal. Ch. VI. C.	Str. Eng. I. E.F.J. Mch. Eng. III D. Anal. Ch. IV. A. Anal. Ch. V. B. Elec. Eng. III G.	Str. Eng. I. E.F.J. Mch. Eng. III D. Anal. Ch. IV. A. Anal. Ch. V. B. Elec. Eng. III G.	Engineering Society Meeting.
Sat.	Eng. Fld. Wk. II. (a) E Gen. Eng. II. (b) E. Fire Assay(b) A.C.	Eng. Fld. Wk. II. (a) E Gen. Eng. II. (b) E. Fire Assay(b) A.C. Ind. Chem. I. B.D.	Eng. Fld. Wk. II. (a) E Gen. Eng. II. (b) E. Fire Assay(b) A.C. Ind. Chem. I. B.D.	Eng. Fld. Wk. II. (a) E Gen. Eng. II. (b) E. Fire Assay(b) A.C. Ind. Chem. I. B.D.				

TIME TABLE—FOURTH YEAR.

	VIII.	IX.	X.	XI.	I.	II.	III.	IV.
Mon.		Railway III. E. Power Plant Economics G.J. Mining II. A. Phys. Ch. III. B.D.	Rail. Eng. II. E. Metallurgy II A.B.D. Elec. Eng. V. G.J. Mech. Eng. V. F.	Geology VI. C. Mech. Eng. IV A.D.E.G.		Hyd. Eng. IV. E. Gen. Eng. II. A. Elec. Eng. VII. F. Elect. Eng. VI. G.	Gen. Eng. V. E.J. Elec. Eng. VII. F. Elect. Eng. VI. G.	Economics A.B.C.D.E.F.G.J.
Tues.	Str. Eng. III. E.J.	Metallurgy II. A.B.D. Elec. Eng. V. G.J.	Mun. Eng. II. E.H. Hyd. Eng. I. A.F.G. Ind. Ch. III. D.	Hyd. Eng. III. E.J. Geology VIII. A.C. Ind. Ch. III. D. Thermo. III. F.G.	Mech. Eng. V. F. Ind. Chem. II. A.E.J. Ind. Chem. III. D.	Mech. Eng. V. F. Elec. Eng. V. G.J. Metallurgy IV. A. Phys. Chem. III. B.D. Hyd. Eng. II. E. Mining IV. A.	Mech. Eng. V. F. Elec. Eng. V. G.J. Metallurgy IV. A. Phys. Chem. III. B.D. Rail. Eng. II. III. E. Mining IV. A.	Mech. Eng. V. F. Elec. Eng. V. G.J. Metallurgy IV. A. Phys. Chem. III. B.D. Rail. Eng. II. III. E.
Wed.		Struct. Eng. II. E. Elec. Eng. IV. G.J. Ind. Chem. III. D.	Gen. Eng. II. A. Mun. Eng. III E.H. Gen. Ch. II. B.D. Mch. En. VIII F.G.	Rail. Eng. III. E. Elec. Eng. V. G.J. Geology VIII A.C. Ind. Ch. III. D. Mech. Eng. V. F.	Metallurgy III. A.G. Mech. Eng. V. F. Struct. Eng. I. D.	Struct. Eng. II. E. Mech. Eng. V. F. Anal. Chem. VI. D. Elec. Eng. IV. G.J. Metallurgy IV. A. Mining IV. A.	Struct. Eng. II. E. Mech. Eng. V. F. Anal. Chem. VI. D. Elec. Eng. IV. C.J. Metallurgy IV. A. Mining IV. A.	Struct. Eng. II. E. Mech. Eng. V. F. Anal. Chem. VI. D. Elec. Eng. IV. G.J. Metallurgy IV. A. Mining IV. A.

(a) Denotes First Term. (b) Denotes Second Term. A.B.C.D.E.F.G.H.J. Denote Courses.

TIME TABLE—FOURTH YEAR (*Continued*).

	VIII.	IX.	X.	XI.	I.	II.	III.	IV.
Thurs.	Mineralogy VI. A.B.C. Elec. Eng. IV. G.J.	Metallurgy II. A.B.D. Thermo. III. F.G. Geology IX. E. (a)	Mun. Eng. I. IV. E.H. Hyd. Eng. I. A.F.G.	Geology VI. C. Mech. Eng. IV. A.D.E.G.J.	Mech. Eng. VI. F. Metallurgy II A.B.D.	Mech. Eng. VI. F. Struct. Eng. III. E.J. Elect. Eng. VI. G. Mining III, A. Ind. Chem. III, D	Mech. Eng. VI. E. Struct. Eng. III. E.J. Elect. Eng. VI. C. Ind. Chem. III. D.	Mech. Eng. VI. F. Struct. Eng. III. E.J. Elec. Eng. VI. G.
Fri.	Milling A.B. Eng. Field Work III. E.J.	Elec. Eng. V. G. Milling A.B. Eng. Field Work III. E.J. Mech. Eng. VI. F. Anal. Chem. VI D.	Elec. Eng. V. G. Milling A.B. Eng. Field Work III. E.J. Thermo. IV. F. Anal. Chem. VI. D.	Ind. Chem. III. D. Milling A.B. Eng. Field Work III. E.J. Thermo. IV. F. Elec. Eng. VI. G. Geology VII. C.	Milling A.B. Thermo. IV. F. Struct. Eng. I. D.	Milling A.B. Thermo. IV. F. Gen. Eng. IV. E.J. Elec. Eng. VI. G. Struct. Eng. I. D.	Milling A.B. Thermo IV. F. Gen. Eng. IV. E.J. Elec. Eng. VI. G. Struct. Eng. I. D.	Meeting of Engineering Society
Sat.	Milling A. Thermo. III. F.G. Ind. Chem. III(a) D. Fire Assay. (b) B.D.	Milling A. Thermo. III. F.G. Ind. Chem. III(a) D. Mun. Eng. II. III E. Fire Assay. (b) B.D.	Milling A. Thermo. III. F.G. Ind. Chem. III(a) D. Mun. Eng. II. III E. Fire Assay. (b) B.D.	Milling A. Thermo. III. F.G. Ind. Chem. III(a) D. Mun. Eng. II. III E. Fire Assay. (b) B.D.				

JUNIOR MATRICULATION EXAMINATIONS.

SEPTEMBER, 1910

		9 a.m.	2 p.m.
Thursday,	15th Sept.	English Composition	English Literature.
Friday,	16th Sept.	History.	Chemistry.
Saturday,	17th Sept.	Latin Authors.	Latin Grammar and Composition.
Monday,	19th Sept.	Physics.	
Tuesday,	20th Sept.	Geometry.	Algebra.
Wednesday,	21st Sept.	French Authors	French Grammar and Composition.
Thursday,	22nd Sept.	Greek Authors.	Greek Grammar and Composition.
		German Authors.	German Grammar and Composition.

Time table for supplementary examinations in September will be issued **first week in September.**

FACULTY.

NATHAN F. DUPUIS, M.A., F.B.S., F.R.S.C.—Professor of Mathematics and Dean of Faculty.
WILLIAM L. GOODWIN, B.Sc. (Lond.), D.Sc. (Edin.), F.R.S.C.—Professor of Chemistry and Director of School of Mining.
WILLIAM NICOL, M.A.—Professor of Mineralogy.
L. W. GILL, M.Sc.—Professor of Electrical Engineering.
S. F. KIRKPATRICK, M.Sc.—Professor of Metallurgy.
J. C. GWILLIM, B.Sc.—Professor of Mining Engineering.
D. H. MARSHALL, M.A., F.R.S.E.—Emeritus Professor of Physics.
A. K. KIRKPATRICK, C.E.—Professor of Civil Engineering.
ALEXANDER MACPHAIL, B.Sc.—Professor of General Engineering.
A. L. CLARK, M.A., Ph.D.—Professor of Physics.
F. O. WILLHOFFT, M.E., M.A.—Professor of Mechanical Engineering.
M. B. BAKER, B.A., B.Sc.—Professor of Geology.
W. O. WALKER, M.A.—Associate Professor of Chemistry.
JOHN WADDELL, B.A., D.Sc., Ph.D.—Assistant Professor of Chemistry.
W. C. BAKER, M.A.—Assistant Professor in Physics.
LEO. F. GUTTMAN, Ph.D., F.I.C.—Assistant Professor of Chemistry.
L. A. H. WARREN, M.A.—Lecturer in Applied Mathematics.
E. W. HENDERSON, B.Sc.—Lecturer in Electrical Engineering.
LINDSAY MALCOLM, M.A., B.Sc.—Lecturer in Civil Engineering.
G. J. McKAY, B.Sc.—Lecturer in Mining and Metallurgy.
C. F. LORENZ, M.Sc., Ph.D.—Lecturer in Physics.
W. C. WAY, M.Sc.—Lecturer in Mechanical Engineering.
W. D. BONNER, M.A.—Lecturer in Chemistry.
J. K. ROBERTSON, M.A.—Lecturer in Physics.
G. H. HERRIOT, B.Sc.—Lecturer in Mathematics.
R. J. MANNING, M.A.—Lecturer in Chemistry.

J. WADDELL, B.A., D.Sc., Ph.D.—Librarian.
GEO. Y. CHOWN, B.A.—Secretary-Treasurer.

Demonstrators.

CHEMISTRY—R. C. Easson, M.A.
PHYSICS—S. H. Henry, M.A.; W. A. Skirrow, M.A.; W. J. Lamb, H. W. McKiel, B.A.; W. W. Doxsee, M.A.; F. W. Wallace, C. W. Day, W. S. Earle.

Professors of Queen's University whose classes are attended by students of the School of Mining.

English.....JAS. CAPPON, M.A
Botany.....W. T. MACCLEMENT, M.A.
Animal Biology.....A. P. KNIGHT, M.A., M.D.
German.....JOHN MACGILLIVRAY, Ph.D. (Leipsic).
French.....P. G. C. CAMPBELL, M.A. (Oxon).
Mathematics.....J. MATHESON, M.A.
Economics.....O. SKELTON, M.A.

ARTICLE I.—ANNOUNCEMENT.

1. The School of Mining is a branch of the *School of Mining and Agriculture,* incorporated by Act of the Legislature of Ontario. It is affiliated to Queen's University, which confers all degrees.

2. Objects—The objects of the School of Mining are to give a thorough scientific education, both theoretical and practical, to men studying for the profession of the mining, civil, electrical, mechanical, chemical, or sanitary engineer, the assayer, the consulting geologist, and the metallurgist; and to provide for prospectors, mine foremen, and others interested in the discovery and winning of minerals, such instruction as shall make their occupations more interesting and less liable to failure.

3. Situation—The School has been placed near Queen's University so as to take advantage of the instruction therein provided in Mathematics, English, French, German, and the economic and biological sciences. It is in this way possible to equip and carry on a first-class technical school on a much smaller revenue than would otherwise be called for to maintain the high standard of scholarship which the age demands of the engineering profession.

Kingston is well situated as the seat of a Mining School. Geology and mineralogy, two of the fundamental subjects of a mining engineer's education, are studied to best advantage where the minerals can be seen as they lie in nature, and where geological formations can be examined *in situ.* In a few hours a class of students can be taken by carriage to a region so rich in mineral species that about forty different kinds have been secured in an afternoon. There is also a great variety of geological formation within easy access. If to this be added the neighborhood of mines in process of development or in operation, the result is an ideal Mining School city. The German Government has planted its mining schools in such cities where the education of the mining engineer can be given that practical turn which not only lends a charm to the period of his study, but shortens the time between graduation and thorough efficiency and confidence in the practice of his profession. The possibilities of the country to the north of Kingston are, in these respects, very

great, and a glance at a geological map shows that the city itself is situated where the mineral-bearing formations, cutting like a broad wedge through the limestone, reach the St. Lawrence and Lake Ontario. The region of mineral-bearing rocks is thus brought almost to the city. On either side, the water front is bordered by a band of limestone, broadening as it extends east and west.

Kingston is also the centre of navigation for Ontario. The Locomotive Works, which are the largest locomotive shops in Ontario, the Dry Dock, the Rideau Canal, and the numerous water powers in the district, offer advantage for the students in Civil, Electrical and Mechanical Engineering.

4. Expenses of a Course—The following statement of expenses is made from information obtained from students who have kept an account of their expenditures. Personal expenses are not included in the estimates. The average expense for class fees is taken in this estimate:

FOR EACH SESSION.

Board, lodging and washing	$ 98 00	to	$150 00
Books and Stationery	15 00	"	25 00
Incidentals	9 00	"	14 00
Excursions (geology, mineralogy and mining)	8 00	"	12 00
Class and other fees	100 00	"	100 00
	$230 00		$301 00

These estimates are based on board, etc., at from $3.50 to $5.00 per week, at which rates good board can be had in Kingston.

The fee for graduation is not included in the estimate.

ARTICLE II.—REQUIREMENTS FOR ADMISSION.

I. Every regular student is required to pass the Matriculation examination or an equivalent thereto before being admitted to examinations leading to a diploma or degree, and must follow one of the courses hereafter mentioned.

II. Special Students—Students not proceeding to a degree may take any classes for which they are prepared. The work in Chemistry, Mineralogy, Geology, Drawing, Surveying, etc., is so

arranged that those who wish to study these subjects, either for their scientific interest or as leading to professions other than engineering, may profitably pursue their studies here.

III. Matriculation—The following are the conditions of Matriculation:

(1) Having matriculated in any University in the British Empire or the United States.

(2) Having passed the Junior Leaving or Junior Matriculation Examination of the Department of Education of Ontario or equivalent examinations in the subjects of English Composition, English Literature, Algebra and Geometry, History (British and Canadian), together with any two of the following: Latin, Greek, French, German, and Experimental Science. The Matriculation examinations may also be taken in Queen's University in September. Other examinations will be accepted, so far as they are equivalent.

Note—Equivalent examinations are:

Ontario	Junior Leaving.
Prince Edward Island	Second Class.
Nova Scotia	Grade XI.
New Brunswick	Second Class.
Quebec	Academy Grade III. University School AA.
Manitoba	Second Class.
Saskatchewan Alberta	Grade VII.
British Columbia	Intermediate.

United States—A. Having passed the matriculation examinations of any University or Technical College of recognized standing.

B. Presenting a certificate from any School which is on the list of approved Schools of any University or Technical College of recognized standing.

(3) Candidates who offer for matriculation any conditions other than (1) or (2) will forward to the Secretary, for the consideration of the Faculty, their applications accompanied by certificates and information.

(4) Students who have already taken, in a university arts or science faculty or in a recognized technical or military school, subjects included in a degree course in the School of Mining will, on entering upon a course for the degree of B.Sc., be admitted to the year for which they are qualified.

Special rates for students attending Queen's University or the School of Mining.

TERRITORY—Between Kingston and any station in Canada on the Canadian Pacific, the Grand Trunk, the Canadian Northern, or the Intercolonial Railway, either direct or over any one of the other lines, where the one-way regular first-class rate is $20 or more.

CONDITION—If any student is coming to attend Queen's College, or the School of Mining *for the first time*, a certificate to that effect will be accepted from parent, guardian, clergyman or magistrate. Subsequently going to or returning from Kingston, certificates must be signed by the Registrar of the University.

RATE—One-way continuous passage tickets will be issued at half the regular, first-class one-way rate, *minimum rate to be charged*, $20. *For example, if the first-class one-way rate is* $50, $25 *will be charged, but if the one-way rate is less than* $40, $20 *will be collected.*

ARTICLE III.—SUBJECTS OF MATRICULATION REQUIRED BY THE SCHOOL OF MINING.

GREEK.

Translation into English of passages from the prescribed texts, with questions thereon.

Translation at sight of simple narrative passages similar to the Xenophon prescribed.

Questions in Greek accidence and on the common rules of Greek syntax, to test the candidate's accuracy and comprehension in such matters as are needful for the intelligent reading of his texts.

The following are the prescribed texts:—

1911: Xenophon, *Philpotts and Jerram*, Easy Selections from Xenophon, chaps. 3, 4, 5; Homer, Iliad I, 1-350.

1912: Xenophon, *Philpotts and Jerram*, Easy Selections from Xenophon, chaps. 3, 4, 5; Homer, Iliad VI, 66-118 and 237 to the end.

Two papers will be set: (1) Prescribed texts; (2) translation at sight, accidence and syntax.

Latin.

Translation at sight of passages of average difficulty from Caesar, upon which special stress will be laid.

Translation with questions from a prescribed portion of Virgil's Aeneid.

Questions on Latin accidence.

Translation into Latin of English sentences, involving a knowledge of the following principles of Latin syntax: the common use of the cases; the accusative with the infinitive; the subjunctive in simple sentences; final and result clauses; the law of sequence of tenses; the indirect question; verbs of fearing, doubting and hindering; the use of the participle, gerund and gerundive, active and passive periphrastic; indirect discourse; and the common forms of the conditional sentence. The vocabulary will be taken from the prescribed portion of Caesar, and special stress will be laid upon this part of the examination. The marks assigned for the translation from prescribed authors shall not be more than 25 per cent. of the total marks assigned to the Latin papers.

Examination upon a short prescribed portion of Caesar, to test the candidate's knowledge of Latin syntax and his power of idiomatic translation.

The following are the texts prescribed:—

1911: Caesar, Bellum Gallicum, Book IV, chaps. 20-38, and Book V, chaps. 1-23; Virgil, Aeneid, Book 1, vv. 1-510.

1912: Caesar, Bellum Gallicum, Book IV, chaps. 20-38, and Book V, chaps 1-23; Virgil, Aeneid, Book II, vv. 1-505.

Two papers will be set: (1) Translation at sight, Virgil and accidence. (2) Translation into Latin, syntax and idiomatic translation from prescribed Caesar, etc.

German.

The candidate's knowledge of German will be tested by: (1) simple questions on grammar; (2) the translation of simple passages from English into German; (3) Translation at sight of easy passages from modern German, and (4) an examination on the following prescribed texts:—

The texts contained in the High School German Reader.

1911: *Leander*, Träumereien, pp. 45-90 (selected by Van Daell).

1912: *Baumbach, Waldnovellen.*

Two papers will be set: (1) Prescribed texts and translation at sight; questions on grammar; (2) the translation of English into German

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French.

The candidate's knowledge of French will be tested by: (1) simple questions on grammar; (2) the translation of simple passages from English into French; (3) translation at sight of easy passages from modern French, and (4) an examination on the following texts:—

Lamennais, Paroles d'un Croyant, Chaps. VII and XVII; *Perrault,* Le Maître Chat ou le Chat Botté; *Dumas,* Un Nez Gelé, and La Pipe de Jean Bart; *Alphonse Daudet,* La Dernière classe, and la Chèvre de M Seguin; *Legouvé,* La Patte de Dindon; *Pouvillon,* Hortibus; *Loti,* Chagrin d'un Vieux Forçat; *Molière,* L'Avare, Acte III, sc. 5 (Est-ce à votre cocher . . . sous la mienne); *Victor Hugo,* Waterloo, Chap. IX; *Rouget de L'Isle,* La Marseillaise; *Arnault,* le Feuille; *Chateaubriand,* l'Exilé; *Théophile Gautier,* la Chimère; *Victor Hugo,* Extase; *Lamartine,* L'Automme; *De Musset,* Tristesse; *Sully Prudhomme,* Le Vase brisé; *La Fontaine,* Le Chêne et Le Roseau.

1911: *Labiche,* La Grammaire.

1912: *Labiche,* Les Petits Oiseaux.

Two papers will be set: (1) Prescribed texts and translations at sight; questions on grammar; (2) the translation of English into French.

English.

Composition: An essay on one of several themes set by the examiners. In order to pass in this subject, legible writing, correct spelling and punctuation, and grammatical construction of sentences are indispensable. The candidate should also give attention to the structure of the whole essay, the effective ordering of the thought, and the accurate employment of a good English vocabulary. About two pages of foolscap is suggested as the proper length for the essay, but quality, not quantity, will be mainly regarded.

One examination paper.

Literature: Such questions only shall be set as may serve to test the candidate's familiarity with, and intelligent and appreciative comprehension of, the prescribed texts. The candidate will be expected to have memorized some of the finest passages. In addition to questions on the prescribed selections, others shall be set on a "sight passage" to test the candidate's ability to interpret literature for himself.

One examination paper.

1911: Tennyson, The Poet, The Lady of Shalott, Oenone, The Epic and Morte d'Arthur, St. Agnes' Eve, The Voyage, "Break, break, break," In the Valley of the Cauteretz; Browning, My Last Duchess, "How they brought the good news from Ghent to Aix," Love among the Ruins, Home Thoughts from Abroad, Up at a Villa, Andrea del Sarto, The Guardian Angel, Prospice, An Epistle of Karshish, Cavalier Tunes; Shakespeare, Macbeth.

1912: Coleridge, The Ancient Mariner; Wordsworth, Michael, Influence of Natural Objects, Nutting, Expostulation and Reply, The Tables Turned, The Solitary Reaper, Ode to Duty, Elegiac Stanzas, To the Rev. Dr. Wordsworth, "She was a phantom of delight," To the Cuckoo, The Green Linnet, "Bright flower! whose home," To a Skylark ("Ethereal minstrel, pilgrim of the sky!"), Reverie of Poor Susan, To my Sister, "Three years she grew,"

September, 1819, Upon the Same Occasion, and the following twelve sonnets: "Two voices are there," "A flock of sheep that leisurely," "Earth hath not anything," "It is not to be thought of," "Fair star of evening," "O, friend, I know not," "Milton, thou shouldst," "When I have borne in memory," "Brook! whose society," "Scorn not the sonnet," "Tax not the royal Saint," "They dreamt not of a perishable home"; Shakespeare, Merchant of Venice.

History.

Great Britain and Canada from 1763 to 1885, with the outlines of the preceding periods of British History.

The geography relating to the history prescribed.

One half examination paper.

Mathematics.

Algebra: Elementary rules; highest common measure; lowest common multiple; fractions; square root; simple equations of one, two and three unknown quantities; indices; surds; quadratics of one and two unknown quantities.

One examination paper.

Geometry: A.—Constructions.

To construct a triangle with sides of given lengths.

To construct an angle equal to a given rectilineal angle.

To bisect a given angle.

To bisect a given straight line.

To draw a line perpendicular to a given line from a given point in it.

To draw a line perpendicular to a given line from a given point not in the line.

Locus of a point equidistant from two given lines.

Locus of a point equidistant from two given points.

To draw a line parallel to another, through a given point.

To divide a given line into any number of equal parts.

To describe a parallelogram equal to a given triangle and having an angle equal to a given angle.

To describe a parallelogram equal to a given rectilineal figure, and having an angle equal to a given angle.

On a given straight line to describe a parallelogram equal to a given triangle, and having an angle equal to a given angle.

To find the centre of a given circle.

From a given point to draw a tangent to a given circle.

On a given straight line to construct a segment of a circle containing an angle equal to a given angle.

From a given circle to cut off a segment of a circle containing an angle equal to a given angle.

In a circle to inscribe a triangle equiangular to a given triangle.

To find locus of centres of circles touching two given lines.

To inscribe a circle in a given triangle.

To describe a circle touching three given straight lines.

To describe a circle about a given triangle.

About a given circle to describe a triangle equiangular to a given triangle.

To divide a given line similarly to another given divided line.

To find the fourth proportional to three given lines.

To describe a polygon similar to a given polygon, and with the corresponding sides in a given ratio.

To find the mean proportional between two given straight lines.

To construct a polygon similar to a given polygon, and such that their areas are in a given ratio.

To describe a polygon of a given shape and size.

B.—Theorems.

The sum of the angles of any triangle is equal to two right angles.

The angles at the base of an isosceles triangle are equal, with converse.

If the three sides of one triangle be equal, respectively, to the three sides of another, the triangles are equal in all respects.

If two sides and the included angle of one triangle be equal to two sides and the included angle of another triangle, the triangles are equal in all respects.

If two angles and one side of a triangle be equal to two angles and the corresponding side of another, the triangles are equal in all respects.

If two sides and an angle opposite one of these sides be equal, respectively, in two triangles, the angles opposite the other pair of equal sides are either equal or supplemental.

The sum of the exterior angles of a polygon is four right angles.

The greater side of any triangle has the greater angle opposite it.

The greater angle of any triangle has the greater side opposite it

If two sides of one triangle be equal, respectively, to two sides of another, that with the greater contained angle has the greater base, with converse.

If a transversal fall on two parallel lines, relations between angles formed, with converse.

Lines which join equal and parallel lines towards the same parts are themselves equal and parallel.

The opposite sides and angles of a parallelogram are equal and the diagonal bisects it.

Parallelograms on the same base, or on equal bases, and between the same parallels are equal.

Triangles on the same base, or on equal bases, and between the same parallels are equal.

Triangles equal in area, and on the same base, are between the same parallels.

If a parallelogram and a triangle be on the same base, and between the same parallels, the parallelogram is double the triangle.

Expressions for area of a parallelogram, and area of a triangle.

The complements of the parallelogram about the diagonal of any parallelogram are equal.

The square on the hypotenuse of a right-angled triangle is equal to the sum of the squares on the sides.

If a straight line be divided into any two parts, the sum of the squares on the parts, together with twice the rectangle contained by the parts, is equal to the square on the whole line.

The square on a side of any triangle is equal to the sum of the squares on the other two sides + twice the rectangle contained by either of these sides and the projection of the other side on it.

If more than two equal straight lines can be drawn from the circumference of a circle to a point within it, that point is the centre.

The diameter is the greatest chord in a circle, and a chord nearer the centre is greater than one more remote. Also the greater chord is nearer the centre than the less.

The angle at the centre of a circle is double the angle at the circumference on the same arc.

The angles in the same segment of a circle are equal, with converse.

The opposite angles of a quadrilateral inscribed in a circle are together equal to two right angles, with converse.

The angle in a semicircle is a right angle; in a segment greater than a semicircle less than a right angle; in a segment less than a semicircle greater than a right angle.

A tangent is perpendicular to the radius to the point of contact; only one tangent can be drawn at a given point; the perpendicular to the tangent at the point of contact passes through the centre; the perpendicular from centre on tangent passes through the point of contact.

The angles which a chord drawn from the point of contact makes with the tangent, are equal to the angles in the alternate segments.

The rectangles under the segments of intersecting chords are equal.

If $OA.OB. = OC^2$, OC is a tangent to the circle through A, B and C.

Triangles of the same altitude are as their bases.

A line parallel to the base of a triangle divides the sides proportionally, with converse.

If a vertical angle of a triangle be bisected, the bisector divides the base into segments that are as the sides, with converse.

The analogous proposition when the exterior angle at the vertex is bisected, with converse.

If two triangles are equiangular, the sides are proportional.

If the sides of two triangles are proportional, the triangles are equiangular.

If the sides of two triangles about equal angles are proportional, the triangles are equiangular.

If two triangles have an angle in each equal, and the sides about two other angles proportional, the remaining angles are equal or supplemental.

Similar triangles are as the squares on corresponding sides.

The perpendicular from the right angle of a right-angled triangle on the hypotenuse divides the triangle into two which are similar to the original triangle.

In equal circles angles, whether at the centres or circumferences, are proportional to the area on which they stand.

The areas of two similar polygons are as the squares on corresponding sides.

If three lines be proportional, the first is to the third as the figure on the first to a similar figure on the second.

Questions and easy deductions on the preceding constructions and theorems.

It is recommended that the study of formal demonstrative Geometry be preceded by a course in Practical Geometry, extending over not more than a year, and embracing the following:

Definitions; fundamental geometric conceptions and principles; use of simple instruments, as compasses, protractor, graduated rule, etc.; measurement of lines and angles, and construction of lines and angles of given numerical magnitude; accurate construction of figures; some leading propositions in plane geometry reached by induction as a result of accurate construction of figures; deduction also employed as principles are reached and assured. At the examination questions may be given in Practical Geometry, the constructions being such as naturally spring from the prescribed course. Candidates must provide themselves with a graduated rule, compasess, set-square and protractor.

In the formal deductive Geometry, modifications of Euclid's treatment of the subject will be allowed, though not required, as follows:

The employment of the "hypothetical construction."

The free employment of the method of superposition, including the rotation of figures about an axis, or about a point in a plane.

A modification of Euclid's parallel postulate.

A treatment of ratio and proportion restricted to the case in which the compared magnitudes are commensurable.

One examination paper.

Elementary Experimental Science.

Physics: Use of the metre rule; use of calipers and vernier for more accurate metric measurements (*e.g.*, diameters of wires, thickness of glass, plates, etc.); numerical calculations, in the metric system.

Use of balance.

Specific gravity, by specific gravity bottle and hydrostatic balance, of liquids and of solids.

Boyle's law; barometer; diffusion of gases.

Use of Fahrenheit and centigrade thermometers; determination of zero and boiling point; boiling point dependent on pressure.

Expansion of solids, liquids and gases, examples.

Specific heat; latent heat; easy numerical examples.
Transmutation of matter; indestructibility of matter.
Solution, precipitation, crystallization and evaporation.
One half examination paper.

Chemistry: Properties of hydrogen, chlorine, oxygen, sulphur, nitrogen, carbon and their different compounds, especially those of economic and industrial importance. Mixtures, solutions, chemical compounds, elements, nomenclature, laws of chemical combinations, *e.g.*, combining weights, chemical formulæ and equations, with easy numerical examples.

ARTICLE IV.—SCHOLARSHIPS AND PRIZES.

1. EXHIBITION OF 1851 SCIENCE RESEARCH SCHOLARSHIP.

This scholarship, of the annual value of £150 stg., is awarded by Her Majesty's Commissioners for the Exhibition of 1851 to students who have given evidence of capacity for original research, and (except in very special circumstances) are under 30 years of age.

The nominee must be a British subject, must have been a *bona fide* student of Queen's University for three years, must have been a student of this University for a full year immediately before his nomination, must be a student of the University at the time of his nomination, (or he must have been a student at this University for a full year ending within twelve months prior to his nomination and since ceasing to be such student must have been engaged solely in scientific study) and must pledge himself not to hold any position of emolument whilst holding the scholarship. He is recommended to the commissioners by the Senate of the University. The scholarship may be held for a second year, if the report of the first year's work be satisfactory to the Commissioners. The scholar will, in the absence of special circumstances, be required to proceed to an institution other than that by which he is nominated, and there pursue some investigation likely to promote technical industries or scientific culture. The particular investigation the student proposes to pursue must be stated before a scholarship can be awarded.

The next recommendation will be made by the Senate in April, 1911.

Science Research Scholars recommended by Queen's University:

Norman R. Carmichael, M.A., 1893-94.
Thomas L. Walker, M.A., 1895-6.
Frederick J. Pope, M.A., 1897-8.
Wm. C. Baker, M.A., 1900-1.
C. W. Dickson, M.A., 1901-2-3.
C. W. Knight, B.Sc., 1904-5.
F. H. MacDougall, M.A., B.Sc., 1905-6.
C. Laidlaw, B.A., M.D., 1907-8.
N. L. Bowen, M.A., B.Sc., 1909-10.

2. The Chancellor's Practical Science Scholarship.—Value $70. Given by Sir Sandford Fleming, C.E., K.C.M.G., LL.D., Chancellor of the University. Awarded to the Practical Science student passing the best examination at the end of the first year.

3. Mowat Scholarship.—Value $50. Given by Ex-Mayor Mowat. Awarded to the Practical Science student who obtains the highest standing in the second year in Mathematics II, Physics II and Senior Chemistry.

4. Canadian Mining Institute Prizes—Premiums and prizes, at the discretion of the Council, may be given annually for papers read by students during the year. Any such award shall be made by the Council within three months after the Annual Meeting.

5. Engineering Society Prizes.—The Engineering Society of Queen's University offers two prizes of $15.00 and $10.00 for the two best papers on scientific subjects, by members of the society. These papers must be read before the society, and five papers, at least, must be presented before the prizes will be awarded. These prizes are open for competition to all students of Engineering.

6. The M. L. Hersey Fellowship in Chemistry.—This Fellowship of the annual value of $500, has been endowed by Milton L. Hersey, M.Sc., LL.D., of Montreal. It is open to graduates of all universities and technical colleges. The holder of the Fellowship is expected to assist in the department of Chemistry and to devote part of his time to research.

Applications addressed to the Secretary of School of Mining, Kingston, Ont., stating qualifications and enclosing recommendations will be received up to July 31st.

ARTICLE V.—REGULATIONS.

N.B.—Students taking a regular course are subject to all rules and Regulations immediately upon publication, unless otherwise specified.

1. Sessional Examinations.—All examinations for degrees are held under the direction of Queen's University, requirements for pass standing being 40 per cent., and candidates must make application on forms supplied by the Registrar. Sessional Examinations are held in all the subjects prescribed in the various courses. In determining a student's standing at a sessional examination the professors in the different departments are empowered to take into account a student's entire class record. Examination fees must be paid to the Registrar of the University not later than March 23rd for the April examinations, and September 1st for the supplemental examinations.

Matriculated students must take the April examinations in all subjects in which they are registered and in which these examinations are held. Failure in more than four classes, including practical classes in which no written examinations are held, involves the loss of the session. A student failing in not more than four classes is given supplemental examination in the following September; if he fails in more than two of these examinations he must repeat the whole work of the year except those subjects in which his standing is second division (55 p.c.) or higher. A student shall not enter the third year until he has passed all the examinations of the first year; nor the fourth year until he has passed all the examinations of the second year. In this connection each of the three sections of Mathematics I counts as one class, and each of the two sections of Physics I as one class, and all other classes count as one each.

2. Christmas Examinations.—Examinations are held in the different subjects before the Christmas vacation which may count 25 per cent. on the April Examinations. Regular examinations will be held for the first year students on the last four days before the Christmas vacation, under the same conditions as the April examinations, except that the examinations will be restricted to two hours each. Any student failing in more than four of these examinations

to secure 40 per cent. shall be refused admission in the following spring term, half class fees being returned in such cases.

3. Attendance.—Students are required to attend 80 per cent. of class lectures before permission will be given to write on examinations, and 80 per cent. of Laboratory hours before laboratory work will be certified. Exemption from this rule can be obtained only on application to the Faculty.

4. Practical Work.—Students are required to take the practical courses given in the calendar unless they have followed similar courses in other educational institutions, but instructors may, at their discretion, modify the work in the case of students who have had experience in the field, in engineering works, etc. Such students may be set immediately at more advanced work than that required of those who have not had such experience.

5. Courses.—All students must take the subjects required in their courses in conformity with the calendars of their years of attendance. If a student wishes to change his course he must first obtain the permission of the Faculty.

6. Graduation. — Diplomas for the three years' course are given by the School of Mining, and application for same must be made to the Secretary, in writing, and the fees paid, before March 23rd. A candidate for a degree in one of the four years' courses must make application and pay the fees to the Registrar of the University before March 23rd. If the candidate fails in his examination the fees will be returned.

7. Graduation with Honours.—A student to graduate with Honours must enter the final year without back classes, and reach the first division (70 per cent.) in certain professional subjects which shall approximate half the work of the year, and must reach second division (55 per cent.) in all the other subjects of the year. Credit for Honour standing will be given on the diploma and a mark of distinction will be placed with the names of those graduating with Honour standing in the list of graduates.

8. Extra-Mural Students.—Students who are not able to attend the School may register in the classes of Junior English,

Junior and Senior Chemistry, Elementary Mineralogy and Geology, as extra-mural students of Queen's University (see Calendar of Queen's University). Tutors are appointed to assist them by correspondence.

9. Excursions.—The excursions are compulsory for all students in Mineralogy and Mining. (See Field Classes in Geology and Prospecting).

10. Registration—All students are required to register and pay the registration, athletic and class fees within ten days of the opening of the session. A student who fails to register within this time must pay an additional fee of $3.00. No student proceeding to a degree will be allowed to enter upon the work of a session after October 31st. Under special circumstances students may be admitted to the first year after October 31st.

11. Fees.—Laboratory fees must be paid before students begin work in the laboratories. Examination, degree graduation, *ad eundem statum*, and University registration fees, are payable to the University Registrar. All other fees are payable to the Treasurer of the School of Mining. Graduation and Spring examination fees must be paid before March 23rd; supplemental examination fees before Sept. 1st.

Registration for Practical Science Students	$10 00
Registration for Arts and Medical Students	1 00
Engineering Society	2 00
Athletics	3 00
Students failing to register within ten days of opening of session must pay an extra fee of	3 00
Change of classes after registration	2 00
Certificate of Standing	1 00

Fees for a Course.

These fees cover all class and laboratory fees for a course.

Per Session, First Year Students	$75 00
Per Session, Second Year Students	85 00
Per Session, Third Year Students	95 00
Per Session, Fourth Year Students	95 00

Students registered 1906-7 to 1908-9 will pay a fee of $60 per session.

Students registered 1905-6 or previously will pay a fee of $50 per session.

FEES FOR SINGLE CLASSES, &c.

These are not additional to the sessional fees.

Any course of Lectures	$12 00
Drawing, One Course, per Session	12 00
Surveying, One Course, per Session	12 00
Assaying Laboratory, per Session	5 00
Chemical Laboratory, per Session	15 00
Petrographical Laboratory, per Session	5 00
Mechanical and Engineering Laboratory, per Session	15 00

GRADUATION AND OTHER FEES.

Graduation B.Sc.	$20 00
" M.Sc.	20 00
" D.Sc.	50 00
" Diploma, three years' course	10 00
Admission *ad eundem statum*	10 00
Examination Fee, April or September	10 00

12. DEPOSITS.—For covering expenses of breakages, etc., a student must deposit $5 with the Treasurer. If at any time the amount of breakages, etc., exceeds $3, an additional deposit of $5 must be made. Charges will be made for the use of platinum, and special expensive chemicals, and apparatus. All money to the credit of the depositors will be returned at the end of the session on presentation of the deposit receipt properly certified.

ARTICLE VI.—DEGREES AND COURSES OF STUDY.

The following courses are offered:

1. Three years' courses for a diploma.

2. Four years' courses for the degree of Bachelor of Science (B.Sc.) in:

(A) Mining Engineering and Metallurgy.
(B) Chemistry and Mineralogy.
(C) Mineralogy and Geology.
(D) Chemical Engineering.
(E) Civil Engineering.
(F) Mechanical Engineering.
(G) Electrical Engineering.
(H) Sanitary Science.
(J) Power Development.

3. Six years' courses for the degrees of Bachelor of Arts and Bachelor of Science (B.A., B.Sc.).

4. A CANDIDATE FOR GRADUATION must have completed either a four or a six years' course and have passed all the required examinations.

5. CERTIFICATES of standing may be obtained on application to the Secretary.

6. The degree of Master of Science (M.Sc.) is granted to candidates who have graduated as B.Sc. and thereafter:—

a. Have practiced their profession for at least two years (one year of which must have been responsible engineering or scientific work).

or *b.* Have spent at least one session in attendance after graduation as B.Sc.

In either case the candidate must have carried on research work, the results of which must be submitted, on or before March 30th, in the form of a thesis satisfactory to the Faculty. The literary as well as the scientific quality of the thesis is considered.

In addition to this, an examination is required, on subjects kindred to that treated of in the thesis. The candidate must give notice of his intention to proceed to the degree at least six months before

he presents himself for examination, and must at the same time submit the subject of his research for approval. The subjects for examination will then be assigned by the Faculty.

7. The degree of Doctor of Science (D.Sc.) is granted to candidates who have graduated as M.Sc. or have otherwise satisfied the Faculty of their ability to proceed, and have thereafter fulfilled the conditions which here follow.

The degree is not granted until after at least three years from the time of graduation as M.Sc. unless one session is devoted to research in an approved university or school of engineering or applied science, in which case the degree may be granted at the end of two years from the time of graduation as M.Sc.

The candidate must submit a thesis embodying the results of his original and independent research in some subject of importance to science. The literary as well as the scientific quality of the thesis is taken into account in judging the candidate's fitness to proceed to the examination.

The candidate must make application in writing to the Secretary at least two years before he proposes to present himself for examination, and must at the same time submit the subject of his research for approval. The subjects of the examination, which will be cognate to that of the thesis, will then be assigned by the Faculty, and will include a reading knowledge of either Scientific French or German.

8. B.A. and M.A. courses in Chemistry, Assaying, Mineralogy, Geology, etc. (See Calendar of Queen's University).

DOMINION LAND SURVEYORS.

The Diploma or Degree in Mining Engineering or in Civil Engineering of the School of Mining, Kingston, is equivalent to the "diploma as Civil engineer" mentioned in clause III of the Dominion Lands Act; so that a candidate for D.L.S. having that diploma from the School of Mining is entitled to examination after one year's service with a D.L.S.

ONTARIO LAND SURVEYORS.

The Ontario Land Surveyors' Act, 55 V., c. 34, s. 18, (28). "The privilege of a shortened term of apprenticeship shall be accorded to any graduate of . . . the School of Mining, Kingston, in Civil Engineering, or in Mining Engineering, and such person shall not be required to pass the preliminary examination hereinbefore required for admission to apprenticeship with a land surveyor, but shall only be bound to serve under articles with a practising land surveyor, duly filed as required by section 32 of this act, during twelve successive months of actual practice, after which, on complying with all the other requirements, he may undergo the examination prescribed by this Act."

A.—MINING ENGINEERING AND METALLURGY.

In the course of Mining Engineering and Metallurgy some branches of study such as drafting, chemistry, and surveying continue through each of the years. It is intended to give the student a sound knowledge and practice in these since they are the usual avenues of employment. The first year, in common with the other engineering courses, is intended to provide a firm foundation in Mathematics, Physics and Chemistry, together with Laboratory work. The second year continues to advance in these fundamental subjects and adds Mineralogy and Geology as special studies.

The third year is principally devoted to technical work in Mining and Metallurgy. An option is introduced for those who wish to specialize in Mining or Metallurgy. A practical course in fire and wet assaying is taken in the second term.

The fourth year takes up more advanced work in Mining and Metallurgy, also Hydraulics; and a considerable portion of the time is spent in designing and mill work. The mining or metallurgical options are continued, both leading to the same degree.

The degree of Bachelor of Science (B.Sc.) is awarded on the completion of this course, and the production of certificates for not less than three months' work in mines or metallurgical works.

First Year.

The letters (*a*) and (*b*) denote first and second term, respectively. The numbers in brackets are the hours per week.

Second Year.

Third Year.

Fourth Year.

Mining Option.

Metallurgy Option.

B.—CHEMISTRY AND MINERALOGY.

This course is intended to prepare candidates to enter upon the practice of chemical analysis and assaying, to fit them for positions in the laboratories of metallurgical, mining, manufacturing and other works, and also for the offices of public analyst, of the chemical department of the Geological Survey, and for other positions where a knowledge of chemistry, including chemical analysis and assaying, and of mineralogy, is required. The first three years are occupied mainly with a study of the subjects mentioned, but the greater part of the time in the second and third years is devoted to chemistry, covering such theoretical subjects as chemical laws and theories, organic chemistry and physical chemistry, and also the practical side as represented by qualitative analysis, preparation of organic compounds, industrial chemistry and quantitative analysis. The fourth year is devoted largely to special chemical analysis and assaying and to research work; but the important modern developments of physical chemistry, so fruitful practically, find a place in the advanced class in this subject. An original research in some chemical or mineralogical subject is carried on in this year. The research may deal with a subject purely chemical, or purely mineralogical, or may combine the two subjects. The results must be reported in the form of a thesis on or before April 1st, and the thesis must be adjudged satisfactory by the Faculty, as a condition for granting the degree.

First Year.

Same as first year Course A.

Second Year.

Mineralogy II (3*a*) 56
Geology I (2) 58
Mathematics II (3) 49

Option I.

Elementary German (3) ..... (See Arts Calendar)

Option II.

Mathematics III (3) 49

THIRD YEAR.

Analytical Chemistry V, VI (10) 52
Organic Chemistry II (4) 55
Physical Chemistry II (4) 53
Industrial Chemistry I (5) 53
Ore Dressing (2) 66
Mineralogy IV (5), VI (1) (6) 56
Geology II (2*a*) (1) 59
Metallurgy I (2) 68

FOURTH YEAR.

Metallurgy II (3) 68
General Chemistry II (1) 52
Physical Chemistry III (4) 53
Milling [or Organic Chemistry III (3), and Advanced Org. Work(4)](7)
Economics (1) 86
Fire Assaying (4*b*) 68
Advanced Work(14) .....

C.—MINERALOGY AND GEOLOGY.

This course is designed to meet the requirements of students who desire a theoretical and practical knowledge of the constitution and history of the earth. It furnishes a foundation for the professions of mineralogist, geological surveyor, mining and consulting geologist, and is useful for those who will in any way be connected with the discovery or the development of the natural resources of the country. It forms a good preliminary course for the mining engineer who wishes to understand thoroughly the groundwork of his profession. Since a knowledge of chemistry is essential for proper comprehension of many mineralogical and geological phenomena, considerable stress is laid on this science in the earlier part of the course. The departments of mineralogy and geology are furnished with well equipped laboratories for the physical and chemical examination of minerals, rocks and ores, and also with collections of illustrative material. While field excursions are made during the session, students are advised to spend the summer vacations in practical field work.

First Year.

Same as first year Course A.

Second Year.

Third Year.

Fourth Year.

D.—CHEMICAL ENGINEERING.

In the construction and operation of chemical works and also in metallurgical enterprises in which the processes are of the more combines a thorough knowledge of chemistry with the education of an engineer; but the chemical engineer must have at his command not merely the elements of general engineering, but also a competent knowledge of those materials of construction and the special kinds of plants and processes which are in use in the works mentioned. The course in chemical engineering covers four years of study, the first two of which do not differ materially from those of other engineering courses. Specialization begins in the third year, in which about half of the time is devoted to chemistry and metallurgy, and the remainder to the elements of mechanical and electrical engineering. Specialization is continued in the fourth year, which includes, in addition to advanced work in chemistry and metallurgy, subjects of electro-metallurgy and chemical engineering.

First Year.

Same as first year Course A.

Second Year.

Mineralogy I (3)	55
Mathematics II (3), III (3) (6)	59
Physics III (2)	50
Analytical Chemistry I, II, III (8)	52
Physical Chemistry I (1)	53
Organic Chemistry I (3)	52
General Engineering I (2)	70
Drawing II, III (6)	83
Workshop II (4)	87

Third Year.

Mechanical Engineering VII (1)	81
Analytical Chemistry IV, V (10)	52
Industrial Chemistry I (5)	53
Physical Chemistry II (4)	53
Metallurgy I (2)	68
Thermodynamics I, II (2*a*) (1*b*)	69
Mechanical Engineering I, III (5)	80
Electrical Engineering I (1*a*), (2*b*)	73
General Engineering II, III (4)	70

Fourth Year.

Analytical Chemistry VI (5)	52
Physical Chemistry III (4)	53
General Chemistry II (1)	52
Mechanical Engineering IV (2)	80
Metallurgy II (4)	68
Economics (1)	86
Industrial Chemistry III (10)	53
Metallurgy IV (5)	68
Fire Assaying (4*b*)	68
Structural Engineering I (4)	79

E.—CIVIL ENGINEERING.

In this course the two main divisions of Civil Engineering, namely Surveying and Draughting, on the one hand, and Structural Design and Construction, on the other, receive full consideration. During the earlier years of the course a sound training along engineering lines is given in Mathematics, Physics, Mechanics and other allied subjects, which are essential to the proper education of an engineer. The student is also made familiar with the use of the various instruments, and by many hours of practical work in the

field and draughting room, becomes skilled in the ordinary operations of Surveying. During the same period the foundation work for structural design is laid by courses of lectures in materials of construction, as well as by demonstrations and practical work in the testing laboratories. The third year is opened by a full month of Engineering Field Work, whereby the student is brought into contact with the problems of railway location, and hydrographic surveying. During the final years more highly specialized instruction and training are given along the lines of the two main divisions, with particular regard to the economic conditions of modern construction. At frequent intervals excursions are undertaken to the quarries, cement works, brick kilns, bridges, railway structures, canals and graving docks, which are to be found within easy distance of Kingston.

The subjects of instruction, number of hours per week devoted to each subject, and the page on which the syllabus is to be found, are indicated in the following table:

First Year.

Same as first year Course A.

Second Year.

Third Year.

FOURTH YEAR.

Railway Engineering II, III (5)	75
Mechanical Engineering IV (2)	80
Structural Engineering II, III (8)	79
Municipal Engineering (6)	76
Hydraulic Engineering II, III, IV (3)	77
Engineering Field Work III (4)	72
Testing Laboratory (2)	
Industrial Chemistry II (1)	53
Geology IX (1) (*a*)	62
Economics (3) (*a*)	86
Workshop II (2)	86

F.—MECHANICAL ENGINEERING.

The profession of Mechanical Engineering embraces the design, manufacture and operation of all classes of machinery, of power plants and manufacturing plants, as well as the executive management of industries. A four years course therefore must be broad enough to give the student a thorough training in the fundamental principles, and any subdivisions intended to train a student for any one of the many specialties, seem not only unwise, but are impracticable on account of the lack of time.

The first two years are devoted to the study of the fundamental subjects of Mathematics, Physics, Chemistry and Mechanics, including experimental work in the various laboratories. Special attention is given to the subject of strength of materials, with practice in testing during the second and third years. The study of the steam engine, and other forms of heat-engines, includes courses in Thermodynamics, Valve Gears, Governors and the subject of balancing of engines. Courses are also given in Mechanism, Machine Design, Shop Work, and the fundamental principles of Electrical Engineering. Instruction in drawing extends over the four years, and gives a thorough drill in modern drafting room practice. In the more advanced courses of the fourth year the student is taught how to apply the general principles to the design and operation of special machinery, of steam and gas engines, of steam boilers and gas producers, and of complete power plants; and the instruction in the laboratories is intended not only to familiarize the student with standard methods of testing, but also to teach him how to attack original problems.

The fourth year students are kept in touch with the local manufacturing concerns in order to familiarize them with modern power plant and shop practice.

FIRST YEAR.

Same as first year Course A.

SECOND YEAR.

Mathematics II (3), III (3) 49
Physics II (4) 50
Analytical Chemistry I (3) 52
Descriptive Geometry (3) 82
General Engineering I (2) 70
Drawing II, III (6) 83
Mechanical Engineering VII (4) .....

THIRD YEAR.

General Engineering II, III (4) 70
Thermodynamics I, II (2) (*a*), (1) (*b*) 69
Mechanical Engineering I, II, III, IV, VII (15) 80
Electrical Engineering I (1) 73
Workshop I (4) 86
Metallurgy I (2) 68
Industrial Chemistry II (1) 53
Structural Engineering I (4) 79

FOURTH YEAR.

Hydraulic Engineering I (2) 77
Thermodynamics III, IV (10) 69
Mechanical Engineering V, VI, VIII, IX (20) 80
Workshop II (4) 86
Economics (1) 68
Electrical Engineering VII (2) 53
Automobile Engineering (Elective) 79

G.—ELECTRICAL ENGINEERING.

The instruction in the first two years of the course in Electrical Engineering provides for a thorough training of the student in the fundamental subjects of Mathematics, Physics, Chemistry and Mechanics, including suitable work in the various laboratories. Part of the time is devoted to elementary drawing and shop work. In the third year the work consists of an introduction to the general prin-

ciples underlying all electrical work together with elementary laboratory work. Considerable time is devoted to the study of Thermodynamics and advanced mechanical drawing. The fourth year is devoted to the study of the action and design of all kinds of electrical apparatus, the design and operation of central stations, electric lighting, electric railways and power transmission.

An important part of the work consists in the working out of problems such as are frequently met in practical work. In this way the student is trained in the application of theory to the solution of practical problems.

Arrangements are made for occasional visits to electrical works.

The whole course is designed to give the student a thorough understanding of the general principles which constitute the basis of all electrical work, together with a knowledge of how these principles are applied in practice. No effort is made to give that intimate knowledge of practical details which experience alone can supply.

First Year.

Same as first year Course A.

Second Year.

Third Year.

Fourth Year.

H.—SANITARY SCIENCE.

This course is intended to prepare students for a profession that is growing in importance every day. Sanitary Science may be defined as that branch of science concerned in the care and promotion of public health. In by-gone years the public health officer was necessarily a doctor of medicine, because he alone was supposed to be able to take care of the health of a community. But with the development of systems of water supply, gas supply, drainage, etc., it has become increasingly apparent that a public health officer must possess, in addition to his medical skill, at least an elementary knowledge of those branches of Practical Science which are concerned in planning, constructing and controlling these public utilities. In other words, a modern public health officer must be in part a trained medical man, and in part an engineer. He must on the medical side be familiar with bacteriology, and with the manner in which contagious diseases are spread. Much of this knowledge is inseparably connected with the water supply, drainage system, the disposal of refuse and sewerage. To organize such works and control them in the interests of the public health of a community is the work of a Sanitary Engineer.

The course, besides preparing students for the profession of Sanitary Engineer, will be found suitable for those who wish to combine a broad scientific course with the ordinary medical one. The two degrees of B.Sc., and M.D., may be taken in six years.

First Year.

Same as first year Course A.

Second Year.

THIRD YEAR.

Human Anatomy as for first year Medical Students (20)	See Med. Cal.
Physiology and Histology (3)	See Med. Cal.
Bacteriology (3)	See Med. Cal.
Junior Materia Medica (3)	See Med. Cal.
Quantitative Analysis (water, air, food) (3)	See Med. Cal.
Hydraulic Engineering I (2)	77
Analytical Chemistry VII (3)	52

FOURTH YEAR.

Human Anatomy; as for second year Medical Students (10)	See Med. Cal.
Final Honours in Animal Biology	See Med. Cal.
Senior Materia Medica and Pharmacy	See Med. Cal.
Pathology (3)	See Med. Cal.
Sanitary Science (2)	See Med. Cal.
Municipal Engineering (3)	76

Students taking this course and intending to study Medicine are advised to register in the Faculty of Medicine not later than the second session. Such students will pay the regular fee in Science, and in addition must arrange with the Medical Faculty regarding fees for Medical classes. After completing the above course, the Medical curriculum may be completed in two years' further study.

J.—POWER DEVELOPMENT.

The introduction of a course in Power Development has followed the demand for a course of studies which will prepare students to take up a branch of engineering which is really the basis of our modern industrial system. The substitution of machinery in the place of the skilled artisan in every department of industry within recent years has largely increased the demand for power. So great is this demand that every available source is being tapped,—the coal mine, the water fall, the oil well, the peat bog, and other minor sources.

The studies in the following courses have been selected with the view of giving first that broad training in fundamental subjects which is essential in fitting the student for any class of engineering work. For this reason the work of the first two years is much the same as in the other courses. In the third year considerable time is devoted to surveying and structural work, a knowledge of these being essential in the laying out of any scheme for the development of power. In the third and fourth years the student may specialize

in the direction of hydro-electric work or in the direction of steam and gas. In the first case special attention is given to hydraulic engineering and surveying, while in the second case an equivalent amount of time is devoted to mechanical engineering, including the production of steam and gas.

(First year same as Course E).

(Second year same as Course E with addition of Drawing III).

THIRD YEAR.

Engineering Field Work I, Sept. 2nd to Sept. 27th	72
Analytical Chemistry VII (3)	52
Electrical Engineering I, II, III (9) (*a*), (10) (*b*)	73
General Engineering II, III (4)	70
Thermodynamics I, II (2)	69
Hydraulic Engineering I (2)	77
Structural Engineering I (4)	79
Engineering Field Work II (4)	72
Mechanical Engineering II, VII (3)	80

Mechanical Engineering III may be substituted for Electrical Engineering III.

FOURTH YEAR.

Industrial Chemistry II (1)	53
Geology IX (1*a*)	62
General Engineering IV, V	71
Engineering Field Work III (4)	73
Electrical Engineering IV, V (10)	73
Hydraulic Engineering III (1)	78
Structural Engineering II, III (3)	79
Mechanical Engineering IV (2)	80
Power Plant Economics (1)	82
Business Economics (3*a*)	86

Thermodynamics III and Mechanical Engineering V may be substituted for General Engineering IV. Geology IX, and Structural Engineering II, III.

HONOUR COURSES IN QUEEN'S UNIVERSITY IN CHEMISTRY, MINERALOGY AND GEOLOGY.

The degree of M.A. will be conferred on students who take Pass standing in the Pass classes, and first class honours in the honour classes, in any one of the following courses.

The degree of B.A. will be conferred on candidates who take Pass standing in the Pass classes, and second or third class honours in the Honour classes of any of the following courses:

Pass Classes.

Junior English.
Senior English.
Junior Mathematics.
Senior Mathematics.
Mental or Moral Philosophy. } Nine.
Junior Physics.
Senior Physics.
Junior Chemistry

Senior Chemistry
Junior Latin
Senior Latin.
Junior Greek.
Senior Greek.
Junior French. } Any two.
Senior French.
Junior German.
Senior German.
Mental or Moral Philosophy.

Honour Classes.

Preliminary and Final Honour Chemistry.
Preliminary and Final Honour Geology. } Any two.
Preliminary and Final Honour Mineralogy.

Specialists' Courses.

By agreement with the Education Department, candidates taking either the M.A. or B.A. degree under the following course, who have made 66 per cent. on the Honour examinations and attended two sessions, will receive the non-professional qualification of Specialist in Science.

Pass Classes.

Junior Latin.
Junior French or German.
Junior and Senior English.
Junior Mathematics.
Junior and Senior Physics.
Junior and Senior Chemistry.
Pass Botany.
Pass Animal Biology.
Pass Mineralogy.
Pass Geology.

Honour Classes.

Preliminary Experimental Honour Physics.
Preliminary Honour Chemistry.
Preliminary Honour Botany.
Preliminary Honour Animal Biology.

Students intending to teach in Ontario are referred to the Faculty of Education Calendar for information regarding professional examinations.

COURSE FOR B.A. LEADING TO THE DEGREES OF B.A. AND B.Sc. IN SIX YEARS.

Students taking these courses are required to have Arts Matriculation and to register the first two years in Arts alone and pay the class and registration fees in Arts, to register the second two years in both Arts and Mining, to pay both registration fees and the Mining class fees and to register the last two years in Mining only, paying the registration and class fees. Arts classes are subject to the regulations in the Arts Calendar, and Mining classes to the regulations in the Mining Calendar.

Junior Latin.	Any two.
Junior Greek.	
Junior French.	
Junior German.	

Senior English.

Mental Philosophy	Any one.
Senior Latin.	
Senior Greek.	
Senior French.	
Senior German.	

Economics	Any one.
Modern History	

Politics.	Any one.
Moral Philosophy.	
Preliminary Honour Latin.	
Preliminary Honour French.	
Preliminary Honour German.	
Intermediate Honour English.	

First and second year of any one of the Engineering courses.

Subjects of Study.

ENGLISH LANGUAGE AND LITERATURE.

Professor—James Cappon, M.A.
Associate Professor—John Marshall, M.A.
Assistant Professor—John F. Macdonald, M.A.
Assistant Professor—W. E. McNeill, M.A., Ph.D.

Junior Class.

1. Practical course in Rhetoric and Composition.
   (*a*) General Theory and illustrations.
   (*b*) Exercises on the above, with essays.

2. Study of Prose Authors in selected passages. Development of English prose as illustrated by Bacon, Addison, Johnson, Macaulay, Ruskin, Carlyle, Huxley, Arnold, and others.

3. A detailed study in class of the following:
   Burroughs, Birds and Bees.
   Jeffries, Under the Acorns.
   Shakespeare, The Merchant of Venice.
   Wordsworth, Lines written near Tintern Abbey, Song at the Feast of Brougham Castle, The Blind Highland Boy, The Solitary Reaper, The world is too much with us, I Wandered Lonely as a Cloud, The Happy Warrior.
   Browning, The Lost Leader, Saul, A Tocatto of Galuppi's, Rabbi Ben Ezra, The Italian in England.

MATHEMATICS.

Professor—N. F. Dupuis, M.A., LL.D., F.R.C.S.
Associate Professor—J. Matheson, M.A.
Assistants—L. A. H. Warren, M.A.; L. Malcolm, M.A., B.Sc.
Lecturers & Tutors—W. H. Houser, B.A.; G. Herriott, B.Sc., D.L.S.

MATHEMATICS I.

This class will meet for the study of Mathematics eight hours per week, of which one hour per week during the second term will be given to astronomy. The subjects of study are as follows: (1) Algebra, including the leading parts of the subject such as multiplication, division, expansion into series, fractions, indices and surds, proportion, graphing of functions,, quadratic; together with permutations and combinations, binomial theorem, undetermined coefficients, summation of series, continued fractions, logarithms, exponentials, etc.

(2) Elementary Geometry, including the first three parts of Dupuis' Plane Geometry, together with the first 131 pages of Dupuis' Solid Geometry. Particular attention will be given to practical applications of geometric principles.

(3) Trigonometry, including the fundamental principles and formulæ with numerous exercises and applications. A great portion of the practical work will be done by means of natural functions. Nature and use of logarithms and tables, inverse functions and the first principles of spherical trigonometry. Three hours per week will be given to geometry and four and a half hours to the other two.

(4) Elements of descriptive astronomy, illustrated by the lantern and by models. One hour per week, second term.

In all these subjects exercises will be required.

MATHEMATICS II AND III.

These are taken in the second year of the student's course. They comprise as follows:—

Mathematics II, three hours per week. Elementary coordinate geometry of two and three dimensions with applications to the curves and surfaces commonly occurring in engineering practice.

Spherical trigonometry and its applications to geodosy, astronomy, etc. Mensuration of areas, surfaces and volumes; mean centre of points and figures; Pappus' theorems and their applications.

Mathematics III, three hours per week. Differential and integral calculus, with applications to curves and curve tracing, measurement of the lengths of curves, the areas of surfaces, and the volumes of solids; mass centre; centre and moment of inertia, radius of gyration; mechanical quadrature, and Weddle's formula; differential equations.

Numerous exercises will be given in all divisions of the subjects.

PHYSICS.

PROFESSOR—Arthur L. Clark, Ph.D.
ASSISTANT PROFESSOR—W. C. Baker, M.A.
LECTURERS—C. F. Lorenz, M.S., Ph.D.; J. K. Robertson, M.A.
DEMONSTRATORS—S. H. Henry, M.A., H. W. McKiel, M.A., W. J. Lamb, F. D. Wallace, M.A., W. A. Skirrow, M.A., W. W. Doxsee, M.A., C. W. Day, W. S. Earle.

PHYSICS I.

The work of this class consists of:—

(1) An elementary course of four lectures per week on General Physics, including (**A**) the measurement and discussion of physical quantities, the fundamental principles of dynamics, their application to various practical problems, and the properties of matter, and (**B**) heat, light, sound, electricity, and magnetism.

(2) Weekly exercises and problems.

(3) Experimental work in the laboratory, two hours per week. Demonstrators are present to direct the manipulation of apparatus and to give necessary explanations. A record of all experiments performed is to be kept in a suitable note-book which must be left with the demonstrators for inspection during the Christmas vacation, for the week following the closing of the laboratory in March, and at such other times as may be announced.

Text-Books—Gallatly, Mechanics for Beginners.
Gregory and Hadley's Class Book of Physics.
Carmichael's Physical Experiments.

PHYSICS II.

(1) A course of two lectures per week on Elementary Applied Mechanics. The principles of dynamics are developed and applied to problems dealing with statics, simple harmonic motion, the motion of a crank and connecting rod, friction, calculation of moments of inertia, rotation, elasticity, energy and its transformations, etc.

(2) Weekly exercises and problems.

(3) Experimental work in the laboratory, two hours per week.

PHYSICS III.

(1) A course of one lecture per week throughout the year on the fundamental principles of electricity and magnetism and some of their applications, with special attention to simple electrical calculations.

(2) Exercises and problems.

(3) Experimental study in the laboratory of certain phenomena of electricity and methods of measuring electrical quantities, two hours per week.

(4) Reading of selected parts of the prescribed text-book.

PHYSICS IV.

(1) Lectures upon the mathematical theory of electricity and magnetism, one hour per week.

(2) Experimental measurement of electrical quantities in the laboratory, with lectures upon selected topics, five hours per week.

In all of the courses in Physics, the work in the laboratory will count a certain percentage of the whole work of the session. In estimating the standing in the laboratory work, both the quantity and quality of the work done will be considered.

THE PHYSICAL LABORATORIES AND LIBRARY.

Two of the largest rooms are equipped as general elementary laboratories for the experiments performed by first and second year students. Six other rooms are fitted for special purposes. All have electric circuits connecting them with a switchboard so that currents of any desired nature may be used in experimental work in any of the rooms. Instruments of precision, such as ammeters, voltmeters, electrometers, measuring microscopes, interferometer, potentiometer with accessories, spectrometer, galvanometers of various types, condensers, standards of resistance, self-induction, and capacity, are available for more advanced work.

The library contains text-books, works of reference, and journals devoted to Physics and related subjects. These may be freely consulted by the student in the reading room between the hours of 8 a.m. and 5 p.m. Books may in general be taken from the building overnight upon reporting to a member of the staff and making a record in a book provided for that purpose. It is only by special permission, however, that any book may be kept away longer than one night at a time.

CHEMISTRY.

Professor—W. L. Goodwin, D.Sc., F.R.S.C.
Associate Professor—W. O. Walker, M.A.
Assistant Professor—John Waddell, B.A., D.Sc., Ph.D.
Assistant Professor—Leo F. Guttmann, A.C.G.I., Ph.D., F.I.C.
Lecturers—W. D. Bonner, M.A.; R. J. Manning, M.A.
Fellow—J. A. McRae, M.A.
Demonstrator—R. C. Easson, M.A.

GENERAL CHEMISTRY.

I. *Elementary.*—An introductory course in general chemistry with experimental demonstrations.

Lectures, two hours per week.

Laboratory, three hours per week.

Text-books:—Smith's General Chemistry for Colleges (The Century Co., New York).
Laboratory Manual of General Chemistry.

II. *Advanced*—one hour per week. A course of lectures on advanced general chemistry.

ANALYTICAL CHEMISTRY.

I. *Introductory qualitative analysis*—three hours per week.

II. *Qualitative analysis of solids, including alloys*—two hours per week.

III. *Qualitative analysis of minerals*—three hours per week.

IV. *Introductory quantitative analysis*—five hours per week. Barium Chloride, Alkalimetry and Acidimetry, Calcium Carbonate, Magnesium Sulphate, Coal, Bleaching Powder, Iron Ore, Copper Ore, Nickel Ore, Lead Ore.

V. *Intermediate quantitative analysis*—five hours per week. Feldspar, Titaniferous Iron Ore, Zinc Ore, Arsenic Ore, Chromite, Barite, an Alloy.

VI. *Advanced quantitative analysis*—five hours per week. Selected problems and exercises in quantitative analysis.

VII. *Special quantitative analysis for courses E and J*—three hours per week. Magnesium Sulphate, Calcium Carbonate, Cement or Limestone, Steel, water for industrial purposes.

ORGANIC CHEMISTRY.

I. *Introductory.* Lectures, one hour per week. Laboratory, two hours per week.

The subject is treated in a general way in the lectures, and students are required to become familiar with laboratory methods in organic chemistry and to make a few typical compounds.

Text-books:—Perkin and Kipping's Text-book of Organic Chemistry (Lippincott & Co.); A. W. Titherley's Laboratory Course in Organic Chemistry (Geo. Philip & Son, 32 Fleet St., London, Eng.).

II. *Intermediate.* Lectures, one hour per week. Laboratory, three hours per week.

The subject is treated in the lectures more in detail, and the typical reactions of the different classes of organic compounds are studied in the laboratory.

Text-books:—Perkin and Kipping's Organic Chemistry.
A. W. Titherley's Laboratory Course in Organic Chemistry.

III. *Advanced.* Lectures, one hour per week. Laboratory, two hours per week.

The lectures deal with selected topics of an advanced character. The laboratory work includes quantitative work and preparations of a more difficult character.

PHYSICAL CHEMISTRY.

I. *Introductory.* Lectures, one hour per week.

Elementary physical and theoretical chemistry with applications to qualitative and quantitative analysis.

Text-book:—Walker's Introduction to Physical Chemistry (Macmillan & Co.).

II. *Intermediate.* Lectures, one hour per week. Laboratory, three hours per week.

The various fields of physical chemistry, including a brief outline of electro-chemistry, are taken up, attention being given to the industrial application of the principles involved.

Text-books:—Walker's Introduction to Physical Chemistry (Macmillan & Co.).
A. Findlay's Practical Physical Chemistry (Longmans, Green & Co.).

III. *Electro-chemistry.* Lectures, one hour per week. Laboratory, three hours per week.

The theoretical and practical study of electro-chemistry, special attention being paid to problems of industrial importance.

Text-books:—Le Blanc's Electro-chemistry (Macmillan & Co.).
A. Findlay's Practical Physical Chemistry (Longmans, Green & Co.).
Elbs-Hutton Electrolytic Preparations (Edward Arnold).

INDUSTRIAL CHEMISTRY.

I. *Chemistry of Manufacturing Processes.* Lectures, two hours per week. Laboratory, three hours per week.

The course deals with the manufacture of chemicals and the apparatus employed, special attention being given to problems of importance to Canada at the present time.

Text-book:—Thorp's Outlines of Industrial Chemistry (Macmillan & Co.).

II. *Engineering Chemistry.* Lectures, one hour per week.

A course on engineering chemistry, the subjects dealt with being those of importance to Engineering students, such as the rusting of iron, hard and soft waters, paints, lubricants, explosives and cements.

III. *Chemical Works and Engineering.* Lectures, three hours per week; practical work, seven hours per week.

Considerations governing the commercial production and manufacture of chemicals; the detailed study and design of chemical apparatus and factories.

THE CHEMICAL LABORATORIES.

The work in chemistry is carried on in the new Chemistry building situated on Union street. This building comprises two lecture rooms for the larger classes, two small lecture rooms for smaller classes, three laboratories accommodating about 160 students in qualitative analysis, two laboratories, holding 96 students, in quantitative analysis, four laboratories fitted up for 450 students in general and medical chemistry; one laboratory, holding 60 students, in organic chemistry; one laboratory for industrial chemistry, besides small laboratories for physical chemistry, electro-chemistry, research, food chemistry and water analysis. A departmental library is provided, also small private laboratories for the instructors. The building is modern in every detail, including a special forced draught ventilation system for noxious gases.

Each student, before entering any practical class, is required to deposit five dollars with the Secretary. On presenting to the instructor of the class the receipt for this and the class ticket, the student receives the key of his locker and a set of apparatus. The amount of the deposit is returned at the end of the session, breakages, etc., having been deducted.

MINERALOGY.

ONTARIO HALL. *Third Floor.*

PROFESSOR—William Nicol, M.A.
FELLOW—S. N. GRAHAM, B.Sc.

The work in this department is intended for students taking the courses in (1) mining engineering and metallurgy, (2) chemistry and mineralogy, (3) mineralogy and geology, (4) chemical engineering, and (5) civil engineering.

It consists of six sections, viz.: Mineralogy I, II, III, IV, V and VI.

Students in Course A take sections I and III in the second year, section IV in the third year, and section VI in the fourth year.

Students in Course B take sections I and II in the second year, and sections IV and VI in the third year.

Students in Course C take sections I, II and III in the second year, and sections IV and VI in the third year.

Students in Course D take section I in the second year.

Students in Courses E, H and J take section V in the fall term of the second year.

MINERALOGY I.

Elementary Mineralogy.

The work in this class is intended as a preparation for those entering upon the studies of geology, petrography, mining and metallurgy. The class should be taken in the second session, after junior chemistry and junior physics of the first session, as a knowledge of chemistry and physics is necessary for a proper comprehension of the subject. The regular work consists of (1) a course of lectures and demonstrations on crystallography at the beginning of the fall term, (2) illustrated lectures on the physical, optical and other properties of minerals, (3) the description of about sixty prominent Canadian minerals, (4) practical work in the determination of these by means of the blowpipe and field tests, (5) excursions on Saturdays for field work.

Each student is supplied for the session with a locked cabinet and collection of minerals for which he is held responsible, and for which a deposit must be made. The practical work of the class is conducted in the mineralogical and blowpipe laboratory, where cabinets containing specimens of commonly occurring minerals are arranged for use. Students are taught to recognize minerals by simple field tests, such as form, colour, streak, hardness, specific gravity, etc. For this work students must provide themselves with pocket-lens, knife, streak-plate and magnet.

The regular class meets at eleven a.m. on Mondays. Excursions to mineral localities in the vicinity of Kingston are held on the Saturdays of the fall term, and when the weather is unfavorable practical work is carried on in the laboratories and museum.

The class in blowpipe analysis meets in the blowpipe laboratory on Friday mornings, 10-12 o'clock. Students must supply their own blowpipe apparatus.

Students are urged to make use of the museum in the basement and of the study room provided for them in the mineralogical department.

Text-Books:—Williams' Crystallography.
Miller's Minerals and How They Occur.
Brush & Penfield's Manual of Determinative Mineralogy and Blowpipe Analysis, 15th Ed., 1906. (Wiley & Sons).

Books for Reference:—Crosby's Tables for the Determination of Minerals.
Eakle's Tables.
Moses & Parsons' Mineralogy, Crystallography and Blowpipe Analysis, 2nd Ed.
Endlich's Manual of Qualitative Blowpipe Analysis.
Landauer's Blowpipe Analysis.
Kolbeck's 6th Ed. of Plattner's Probirkunst mit dem Löthrohre.

Books from the Department Library and from the Professor's private library may be obtained from the Professor.

MINERALOGY II.

Systematic Mineralogy.

The work of this class is intended for those taking courses B and C, and is preparatory to the work in geology, petrography, and descriptive and determinative mineralogy, which should be taken during the session following.

The regular work consists of a course of lectures, three hours per week, dealing with the physical and other properties of minerals, illustrated by specimens from the lecture cabinet, microscopic slides, thin sections, models, charts and lantern slides. Essays on prescribed subjects are required.

Text-Books:—Dana's Text-book of Mineralogy, 1907. (Wiley & Sons).
Williams' Crystallography. (Henry Holt & Co.).

Books for Reference:—Miers' Mineralogy.
Tschermak's *Mineralogie.*
Brauns' *Mineralreich.*

MINERALOGY III.

Optical Mineralogy.

The work of this class is intended for those students only who are taking Course A, mining engineering, and Course C, mineralogy and geology. It is preparatory to the classes of petrography and determinative mineralogy, which should be taken during the session following. The lectures treat of light and the optical properties of minerals. Reflection, diffusion, refraction, dispersion, polarization, absorption, color, etc., are described and illustrated by the use of the lantern and projection apparatus.

Text-Books:—Dana's Text-book of Mineralogy, 1907. (Wiley & Sons).

MINERALOGY IV.

Descriptive and Determinative Mineralogy.

Before taking this class students in Course A must have passed in Mineralogy I and III, and students in Course B in Mineralogy I and II, and students in Course C in Mineralogy I, II and III. It should be taken along with the classes of petrography, economic geology and metallurgy in the third year.

The work of this class consists in the exhibition and description of the mineral specimens contained in the several museum collections, special attention being given to ores, gangue-minerals, those having a commercial value and those of importance as rock-forming minerals in geology. By field tests and the use of the blowpipe, practice is obtained in the determination of minerals. Cabinets furnished with specimens of minerals from various parts of the world are supplied for students' use. The number of specimens is being

constantly increased by collection, donation, exchange and purchase, the aim being to make the collection as complete as possible.

Text-Books:—Dana's Text-book of Mineralogy, 1907.
Brush & Penfield's Manual of Determinative Mineralogy and Blowpipe Analysis, 15th Ed., 1906.

MINERALOGY V.

Preparatory Mineralogy.

The work of this class is intended for students taking the course in civil engineering—Course E—and for those who attend the class of Geology I, without any previous knowledge of mineralogy—students in Course H.

The work consists of a course of about a dozen practical demonstrations, one hour per week during the fall term, to make students familiar with the more common rock-forming minerals and ores, so that the geology lectures may be more intelligible. The students are taught to recognize minerals by field-tests, such as form, colour, lustre, streak, hardness, specific gravity, etc.

The class meets on Wednesdays, at 10 a.m., in the mineralogy lecture room, Ontario Hall, third floor.

The attention of students is called to the collection of minerals on exhibition in the students' study, and to the several collections in the museum in the basement. Students in this class should attend the Saturday excursions.

Text-book:—Miller's "Minerals and How They Occur."

MINERALOGY VI.

Economic Mineralogy.

A course of lectures, illustrated by specimens and lantern slides, supplemented by demonstrations in the museum showing the occurrence and uses of minerals.

The following minerals and mineral substances will be treated: Gold, Petroleum, Asphalt, Graphite, Diamond, the Royal Mint, Ottawa; Antimony and Ores, Corundum, and Carborundum, Portland Cement, Limestone, Feldspar and Kaolin, Talc, Asbestos, Phosphates, Gypsum, Nitre and Borax, the rare earths, the gem minerals, ruby, quartz, etc.

FIELD CLASSES IN GEOLOGY AND PROSPECTING.

The attention of students and others is called to the practical study of geology, mineralogy, and prospecting methods. Some of the chief mineral localities of the Kingston district are visited each session and abundant opportunities are offered for collecting specimens and studying the modes of occurrence of substances of economic value. These excursions are compulsory for all students in geology and mineralogy after the first year. The cost will not exceed $10.00.

GEOLOGY.

PROFESSOR—M. B. BAKER, B.A., B.Sc.
LECTURER—B. Rose, B.Sc.

The instruction in this department is adapted to the needs of the prospector, the mining engineer, and the professional geologist. Provision is also made for persons who desire a knowledge of the subject as part of a general education. Graduates and others who wish to pursue some special line of investigation, or to have the use of the laboratories and apparatus, in order to work up material collected by themselves, will have every facility placed at their disposal.

Students have access to the Geological and Mineralogical museum, which contains a large number of specimens illustrative of petrography, palæontology,, economic minerals, and general geology of Canada.

Advice concerning field work in Geology during the summer vacation will be given by the professor.

Students are advised to procure copies of some of the text-books and to gain some acquaintance with them during the long vacation preceding the beginning of the session in October.

The petrographical laboratories are supplied with electric power and provided with the most approved lathes and other apparatus needed in cutting, slicing, grinding and polishing specimens, and in the preparation of thin sections of minerals and rocks for microscopical examination.

Laboratory facilities are also provided for micro-chemical tests and for the use of the electric magnet and heavy solutions in separating the constituents of the rocks.

The School owns a number of petrographical microscopes of the latest and most improved designs, and a large collection of thin sections of type rocks, minerals and ores with corresponding hand specimens, which are used by the classes for detailed study, under supervision of the staff.

The chemical laboratory of the Geological Department is supplied with the apparatus necessary for the chemical investigation of rocks and ores.

Laboratory facilities are also provided for geological experiments.

The reading room is supplied with geological publications and a library.

Second Year.

I.

ELEMENTARY GEOLOGY.

Students taking this class must have passed in junior chemistry. They are also required to take Mineralogy I or Mineralogy V.

The object of this course is to give a general knowledge of the subject as an introduction to the work of the third and fourth years.

The following themes will be treated of in the lectures:—

The planetary relations of the earth; the atmosphere; waters; solid crust; probable nature of the earth's interior; rocks, their general megascopic and microscopic characters and classification; volcanic action; earthquakes; upheaval; subsidence, geological effects produced by heat, air, water and life; bosses, dykes; veins; stratification; dip; strike; anticline and syncline; faults; foliation; nature and uses of fossils; stratigraphical geology; outline of the geological history of the globe, etc.

The lectures are illustrated by means of maps, diagrams and lantern views.

The laboratory work will consist of the examination of typical specimens of the different groups of fossil plants and animals, and of hand specimens of the more common rocks.

During the months of October and November excursions will be made to places of geological interest in the vicinity of Kingston. Students are expected to take part in all of these excursions. The cost will not exceed five dollars. Each student should provide himself with a suitable hammer, specimen bag and note-book.

Students are required to provide themselves with a copy of W. B. Scott's "An Introduction to Geology," 2nd edition (The Macmillan Co., price $2.60), which is used as text-book.

Books for Reference:

The Elements of Geology. (William H. Norton).
Kemp's "Handbook of Rocks," (price $1.50).
LeConte's Compend of Geology.
Dana's Manual of Geology, (last edition).
Chapman's Minerals and Geology of Ontario and Quebec.
Class Book of Geology (Geikie).

Third Year.

II.

GENERAL GEOLOGY.

Before taking this class students must have passed in Geology I.

In this course a detailed study of the Atmosphere, the Hydrosphere, and the Lithosphere is taken up, including a study of the geological activities concerned in "Weathering." A study is also made of the structural features of Sedimentary, Igneous, and Metamorphic rocks.

Text-Book:—Geology, Vol. I. (Chamberlain & Salisbury).

Books for Reference:

Elements of Geology (Le Conte).
Text-book of Geology (Geikie, Vol. I, II).
Manual of Geology (Dana).

III.

ELEMENTARY PETROGRAPHY.

Students must have passed in Geology I, and Mineralogy II and III.

This course will consist of lectures on the use of the petrographical microscope and accessories in the determination of the rock-forming minerals, and on the determination of some of the more common igneous rocks.

The lectures will be illustrated by means of microscopic projections of thin sections of minerals and rocks, and will be supplemented by laboratory work of two hours per week all session.

A considerable variety of igneous rocks occurs in the Kingston district. These will be studied in the field ands pecimens will be collected by each student for examination in the laboratory.

Each student must provide himself with a copy of Pirsson's Rocks and Rock Minerals, and a copy of Luquer's Minerals in Rock Sections.

Text-Books and Books for Reference:

Rosenbusch—Iddings Microscopical Physiography of Rock-Forming Minerals.

Loewinson-Lessing's Tables for the Determination of Rock-Forming Minerals.

Determination of Rock-Forming Minerals (Johannsen).

Harker's Petrology for students.

Rock Minerals (Iddings).

IV.

MINING GEOLOGY.

Before taking this class students must have passed in Geology I.

Lectures on the origin, modes of occurrence, classification and enrichment of metalliferous deposits. The characters by which ore bodies are sometimes indicated to the prospector will be described. A sketch will be given of the geology of some of the leading mining districts.

During the fall term excursions will be made to various mines in the vicinity of Kingston.

Each student is to provide himself with "Geology Applied to Mining" (Spurr). This will be used as the text-book.

Books for Reference:

Philips' Ore Deposits.

Kemp's Ore Deposits.

Nature of Ore Deposits by D. R. Beck, trans. by W. H. Weed.

Mineral Statistics, Geological Surveys of Canada and the United States.

Rothwell, the Mineral Industry. Vols. I-XIII.

Origin of Ore Deposits. American Institute of Mining Engineers.

V.

GEOLOGY OF CANADA.

Before taking this class students must have passed in Geology I.

In this course special attention will be given to stratigraphical geology and the geology of Canada. Type fossils of the different formations will be studied.

Books for Reference:

Minerals and Geology of Ontario and Quebec (Chapman).
Geology of Canada (Dawson).
Geology and Economic Minerals of Canada (G. S. C., 1909, by Young & Brock).
Manual of Geology (Dana).
Elementary Palæontology (Wood).
Reports of the Geological Survey of Canada.

VI.

Fourth Year.

GENERAL GEOLOGY.

A study will be made of structural and dynamical geology in connection with their bearings on economic problems, the origin of the earth, the origin and descent of igneous rocks.

Opportunities will be offered for those wishing to prosecute any special line of investigation.

Students are advised to devote as much time as possible to field work during the preceding long vacation, and to collect material for study in the laboratory during the winter.

Students are expected to supplement their reading by a study of the collections in the museum.

Text-Book:—Chamberlain & Salisbury's Geology, Vol. I, II and III.

Books for Reference:

Geikie's Field Geology.
Geikie's Founders of Geology.
Zittel's History of Geology.
Geikie's Text-Book of Geology (4th Ed.).
Nicholson's Palæontology.
Zittel's Palæontology (Eastman).
Williams' Geological Biology.
Dana's Manual of Geology.
Kemp's Handbook of Rocks.

VII.

ADVANCED PETROGRAPHY.

A course of lectures will be given on the microscopic characters and classification of the igneous rocks and on the characters, origin and classification of the pre-Cambrian formation.

Special attention will be paid to the metamorphic series of the Kingston district, as exceptional opportunities are here offered for the study of the field relations of these rocks, and for attacking those problems as to their origin which are now attracting the attention of geologists.

Text-Books and Books for Reference:

Kemp's Handbook of Rocks.
Rosenbusch—*Die Massige Gesteine, Elemente der Gesteinslehre.*
Zirkel—*Lehrbuch der Petrographie.* Vols. I, II and III.
Levy and Lacroix—*Les Mineraux der Roches.*
Rosenbusch-Iddings—Microscopical Physiography of Rock-Forming Minerals.
Iddings—The Origin of Igneous Rocks.
Van Hise—Correlation Papers, Archæan and Algonkian.
Iddings, Weed, Pirsson, Washington—Classification of Igneous Rocks.

VIII.

ECONOMIC GEOLOGY.

Students are required to take part in the excursions to various mines in the neighborhood of Kingston.

Lectures on the origin, modes of occurrence and uses of the metals and their ores; materials used in the production of light and heat; minerals used in chemical manufactures; fertilizers; mineral pigments, salt, brine and mineral waters; building materials; cements; refractory materials; abrasive materials; gems and precious stones; miscellaneous.

Text-Books and Books for Reference:

Applied Geology, S. G. Williams.
The Non-metallic Minerals, G. P. Merrill.
Economic Geology of the United States, H. Ries.
Mineral Statistics, Geological Surveys of Canada and United States.
Nature of Ore Deposits, Beck (Weed's Translation).
Reports of the Geological Surveys of Canada and the United States.
Ore Deposits of the United States and Canada, Kemp.

IX.

ROCKS AND ROCK WEATHERING.

This course is intended for students of Civil Engineering.

The occurrence, composition, texture, structure, and alterations of rocks

will be considered with special reference to their effects on the workability of rocks and their uses as materials of construction.

Physiography and drainage will also be studied and a brief summary of the geology of Canada will be given.

Books for Reference:

Chapman's Geology of Canada.
Rocks, Rock Weathering and Soils. Merrill.
Stone for Building and Decoration. Merrill.

X.

FIELD AND LARORATORY GEOLOGY.

The laboratory exercises in this course are designed to illustrate by means of specimens, models, photographs, maps and sections, the principal original and secondary structures of rock; the origin and mode of occurrence of rocks in the earth's crust, their cycles of alteration and change; their interpretation and representation in geological surveys.

The field work comprises observations upon the weathering of rocks; shore phenomena; glacial phenomena; igneous and sedimentary rocks; faulting; folds; joints; cleavage; schistosity. Practice in methods of surveying and geological mapping and construction of sections; measuring the thickness of strata and determining the relative ages of geological structures, and the preparation of a map to scale.

Working hours will be arranged to suit the class at the beginning of the fall term.

BOTANY.

Professor Emeritus—Rev. James Fowler, M.A., LL.D.
Professor—W. T. MacClement, M.A., D.Sc.
Tutor—A. B. Klugh.

This course is open to all Science students.

The work covered will come under the following heads:—

1. Morphology of Seed Plants.
2. Plant Ecology.
3. Destructive Fungi.
4. Timber Trees,—structure, life history and identification.
5. Forest conservation.

9 a.m., Monday, Wednesday and Friday.

Text-books:—Coulter, Plant Relations.
Roth, A First Book of Forestry.

ANIMAL BIOLOGY.

PROFESSOR—A. P. Knight, M.A., M.D.
LECTURER—F. Etherington, M.D., L.R.C.P. & S., Edin.
DEMONSTRATOR—I. G. Bogart, M.D.

Pass Class.

Lectures or demonstration will be given tri-weekly at 9 a.m.

The Arts class occupies three hours a week for the whole session. Part I will extend from October until Christmas and will treat of general biology and the every-day lives of animals.

Part II will deal with the outlines of classification and extend from the Christmas holidays until the close of class work in April. It will be suitable for students taking the honour course in geology or the course in mining engineering.

Arts students must take parts I and II. Students in the Mining School need take Part II only.

Text-book for Mining School Students—Comparative Zoology by J. S. Kingsley.

MINING ENGINEERING.

PROFESSOR—J. C. Gwillim, B.Sc.
LECTURER—G. J. McKay, B.Sc.

These lectures follow the general plan as given under the headings Mining I, Mining II and Mining III.

Mining and milling machinery in actual operation together with lantern views assist these lectures. Current affairs in mining are introduced as much as possible to give the subjects a living interest.

It is expected that mining students will help their apprehension of the work, and their future prospects, by going into the mining districts during the summer vacations. The knowledge of Geology, Chemistry, Mineralogy, Mathematics and Physics, finds its usefulness and necessity in the consideration of the following subjects.

MINING I.

Ore Deposits. Conditions which produce and indicate them; their nature and origin; their affinity with certain conditions and rocks, and their classification. These lectures are supplementary to the study of economic geology.

Prospecting. Methods used in prospecting for lode, placer and coal mines. Location, laws and requirements of mineral prospects and their examination.

Development of Prospects, and the early workings of mines, with a consideration of the many factors entering into the proving up of mineral bodies as commercial quantities.

Boring. The use of long distance drills for prospecting, and for reaching fluids. The rotary Diamond drill, and the Percussion drills; their fields of operation and relative merits.

Excavation. The tools and machines used in breaking and removing rock. Also hand and power drilling to place explosives. The common mining explosives; their uses and operation.

Mining Methods. A consideration of the main factors in developing a mine. The sinking of shafts; driving of tunnels, etc. The stoping or winning of minerals from the vein or ore body.

MINING II.

Placer Mining. Consideration of alluvial deposits and their origin: The placer mining proper, hydraulic placer, and gold dredging.

Supports. Various forms of timbering or supporting a mine's passages, and stope excavations. The timbers used. Costs and alternative methods: causes of decay in timbers and their preservation. The use of iron and masonry.

Transportation. The handling of material underground, by chutes, cars, and hoists; rope and locomotive haulage. Surface transportation by road, rope, and railway. Loading, unloading, and terminal arrangements.

Hoisting. Head frames, ropes, and drums; various systems which balance the load to some extent or give a steady load on the engines. Hoisting of ore. Safety appliances and signalling.

Drainage. Sources of water, drainage by tunnels; hoisting of water; use of pumps, and principal types for light and heavy work. Bulkheads.

Ventilation. Natural and artificial conditions which demand ventilation. Methods of ventilating metal and coal mines. Gases of a coal mine. Fans, and distribution of air in coal mines.

Lighting. Use and place of candles, lamps, and safety lamps.

Accidents. Principles of Employment.

Mine examination and valuation.

MINING III.

One hour a week given to the reading and discussion of student's papers, upon actual mining operations, or experience in the field.

MINING IV.

This work includes the plotting of Mine Surveys, and the designing of some form of mining or milling plant.

SUMMER ESSAY.

During the fourth year an account of some mining or metallurgical operations, with suitable drawings or photographs, is to be prepared from material collected by the student.

ORE DRESSING.

Ore Dressing. Picking and cobbing; crushing methods, and comparative effects in liberation of valuable minerals from gangue; sizing by screens and trommels; theory of fall of bodies in water; classification by the spitzkasten and spitzlutte; theory of jigging; types of jigs; sizing *versus* classification in the preparation of ores for jigging; friction surface concentrators; riffle-washers; magnetic separators—types and application; special modification of concentrators, etc., for coal washing; oil concentration; schemes of practical working plants for all classes of ores.

Gold Milling. Free-milling plants; types of stamp mills, their efficiency and limitations. Construction and maintenance of stamp mills. Other methods of crushing for amalgamation. Principles and practice of amalgamation.

Books for Reference:—(1) C. LeNeve Foster's Ore and Stone Mining. (2) Ihlseng's Mining Manual. (3) Coal and Metal Miners' Pocket-book. (4) H. W. Hughes' Coal Mining. (5) Richards' Ore Dressing. (6) Current Mining Journals.

THE MINING AND METALLURGICAL LABORATORIES.

These are equipped for the testing of ores in small lots from various mining districts.

The machinery used is in most cases of standard sizes and the ores treated of sufficient quantities to give results which are about the same as commercial practice would give. The uses of the Mill and Laboratories are to furnish training and illustration, to experiment with various processes, and to give help at very reasonable rates to those who are seeking some method of treatment. The ores received are sufficient in quantity and variety to illustrate most of the usual methods of treatment found in actual practice. The work is divided into three main portions.

(1) Stamp Milling, Cyanidation, Chlorination and other Metallurgical processes in the term before Christmas.

(2) Concentration processes in the term after Christmas.

(3) In the Metallrugical Laboratory small quantities of ores are treated by smelting in blast or reverberatory furnaces, and experiments are conducted on the refining of metals, such as lead and copper; on the determination of the properties of iron and steel, and in connection with pyrometry, gas analysis, and the operation of the electric furnace.

The equipment of mill and laboratory as it stands at present consists of the following:—10 in. by 7 in. Blake jaw crusher; 16 in. crushing rolls; 5 stamp battery, 850 lbs., stamps with automatic feeder; 10 in. cone grinder; No. 0 Krupp Ball Mill; impact screen; inlet discharge classifier; vertical line classifier; U-tube classifier for slimes; perforated board classifier for slimes; cone classifier and glass tube classifiers; 3 compartment spitzkasten; 3 compartment Hartz jig; 2 compartment Evans high-speed jig; 1 Vezin jig; 4 ft. Frue Vanner; Wilfley table (riffle washer); 16 ft. modern Evans buddle; Wetherell magnetic concentrator; Ball-Norton magnetic separator; Kingston magnetic separator, dry or wet; Sturtevant exhauster and blower; Heald and Sisco centrifugal pump; Frenier and Sons' spiral sand pump; Cazin water-motor; Northey mine pump; centrifugal machine for slime treatment; Johnston filter press for slime treatment; Ingersoll-Sergeant rock drill; Mac Machine Company's balanced valve rock drill; Rand rock drill; tripods for rock drill; drifting column for rock drill; Jackson's hand power rock drill; barrel chlorination plant (350 pounds capacity); cyanide plant (1,000 pounds capacity); reverberatory roasting furnaces, small oil fired reverberatory, gas mufile furnace, soft metal furnace, electric furnace: No. 3 Reichhelm blower; 2 H.P., 4 H.P., 6 H.P. and 25 H.P. electric motors.

A convenient assay laboratory has been fitted up in connection with the mill, where pyrometry, calorimetry gas analysis, and all the wet and fire assaying required for checking the mill work can be carried on.

METALLURGY.

PROFESSOR—F. S. Kirkpatrick, M.Sc.

METALLURGY I.

A thorough drilling in fuels, the special metallurgical uses of each kind, determination of calorific power, experimentally and by calculation from composition, calorific intensity and methods of pyrometry, charcoal manufacture, coals, coke, coking methods, physical and chemical tests of coke, bye-product, coking, producer gas and its manufacture in modern approved appliances, liquid fuels, etc. This is followed by a brief discussion of the various types of metallurgical furnaces, then the physical properties of the common metals are considered, the effect of different impurities, and the constitution and character of the more important alloys. Special attention is given to the study of the properties of the irons and steels and the effect of the method of manufacture on these properties.

METALLURGY II.

Hydro-metallurgy of gold and silver, including cyaniding and chlorination of gold ores and leaching of silver ores with hyposulphite.

Milling and amalgamation of gold and silver ores.

Metallurgy of copper, including treatment of native copper and sulphide ores by concentration and smelting, reverberatory and blast furnace matting, pyritic smelting, refining, and hydro-metallurgy.

Metallurgy of lead, including reverberatory and blast furnace practice, softening, desilverising, refining, etc.

Metallurgy of iron and steel, including preparation of the ore for smelting, production of pig iron in the blast furnace, conversion into wrought iron in the puddling furnace, manufacture of steel by the crucible, Bessemer and open-hearth processes.

METALLURGY III.

Electro-metallurgy; introductory course in electro-chemistry followed by the consideration of the electric smelting of aluminium, copper, magnesium, iron, etc.

Also the consideration of the ordinary methods of recovering zinc, nickel, cobalt, tin, mercury, arsenic, antimony, etc., from the ores.

METALLURGY IV.

Metallurgical laboratory work in the smelting of copper, lead, etc., and the design of some metallurgical plant.

FIRE ASSAYING.

Quantitative determination of gold, silver and lead in ores and bullion by fire assay.

THERMODYNAMICS.

PROFESSOR—F. O. Willhofft, M.E., A.M.

I.

Fundamental laws of Thermodynamics. Behaviour of gases under varying conditions. Theory of air compressors and air motors. Transmission of power by compressed air. Properties of steam and elementary theory of the steam engine. Thermal and mechanical efficiency of heat engines. Operation of simple valves and governors. Measurement of power. Elementary theory of gas engines.

Simple laboratory experiments.

II.

Continuation of I.

III.

Theory of refrigerating machines and systems. Entropy and entropy-temperature diagrams. Superheated steam. Performance of actual engines. Influence of size, speed, and ratio of expansion on economy. Steam jackets. Compound and triple expansion engines. Expansion valves. Advanced theory of gas and oil engines. Steam turbines.

Experiments in Thermodynamic Laboratory.

IV.

Advanced Laboratory Work for Mechanical Engineers.

THERMODYNAMIC LABORATORY.

The equipment of this laboratory includes an air compressor, gas engine and gas producer, gasoline engine, kerosene engine, centrifugal fans, centrifugal pumps, reciprocating pumps, steam engines, condensers, calorimeters, and dynamometers, together with all the auxiliary appaartus required for making tests and carrying on experimental work. All apparatus is of the standard type and latest design.

A considerable part of the practical work in Thermodynamics is done in connection with the central heating and power plant, which supplies heat and power to the various college buildings. This plant affords exceptional advantages for carrying on experimental work, having been designed with due regard to this purpose.

Every year extensive tests are undertaken of commercial power plants located in Kingston and vicinity, and it is believed that this is a specially valuable feature of the course.

GENERAL ENGINEERING.

PROFESSOR—Alexander Macphail, B.Sc.

This subject embraces the physical properties of materials used in the different branches of engineering and the principles involved in the theory of beams, columns, and structures.

GENERAL ENGINEERING I.

Materials of Construction.

Lectures comprise: Strength and quality of timber, stone, brick, cement, mortar, and concrete; physical properties of the metals and alloys used in engineering, and effects of impurities in them; testing for tensile, compressive and transverse strength.

Mechanics of Materials.

Resistance and elasticity of materials; theory and design of simple and cantilever beams; pipes, cylinders, and riveted joints; analytical determination of stresses in simple framed structures; dead and live loads; centres of gravity; moments of inertia; shearing force and bending moments.

Graphical Statics.

Graphical representation of stresses in simple framed structures; graphical determination of centres of gravity; shearing forces and bending moments.

Lecture hours—Monday, 11 a.m. Thursday, 9 a.m.

Books of Reference:—Merriman's "Mechanics of Materials."
Merriman's "Strength of Materials."
Thurston's "Materials of Construction."
Merriman's "Roofs and Bridges," Part II.
Slocum & Hancock, "Strength of Materials."

GENERAL ENGINEERING II.

Mechanics of Materials.

Analysis of restrained and continuous beams and columns; torsion of shafts; combined stresses; flexure of beams and theorem of three moments; plate and lattice girders and columns; resilence and fatigue of materials; initial and temperature stresses; earthworks, retaining walls and dams; arches and arched ribs; suspension bridges.

Graphical Statics.

Graphical determination of stresses in roof trusses, bridges, cranes, earthworks, retaining walls, dams, arches, arched ribs, cantilever and suspension bridges.

Theory of Structures.

Girders, roofs and bridges; selection of types with reference to span, loading, head-room, cost, aesthetic design and other considerations; relative advantages of riveted and pin connections; wind bracing and stiffening trusses; trestles and towers.

Lecture hours—Monday, 2 p.m.; Wednesday, 10 a.m.

Graphical Representation.

Representation of mathematical functions, engineering formulae and data. Progress and cost diagrams, and graphical solution of equations, interpretation of diagrams, solution of problems by means of diagrams.

Lecture hour—Thursday, 11 a.m.

Text-books—Slocum & Hancock, "Strength of Materials."

Books of Reference:—Bovey's "Theory of Structures."
Merriman's "Mechanics of Materials."
Merriman's "Roofs and Bridges," Part I, II, III.

GENERAL ENGINEERING III.

This course consists of practical work in the drafting rooms, mechanical, electrical, and testing laboratories. Its object is to give the student a knowledge of the practical application of the fundamental principles of engineering in general.

Routine tests of cement, lime, mortar, brick, stone, timber, iron, steel, etc. Specific gravity, fineness, tensile and compressive, strength of cement, etc. Stress diagrams, and problems in connection with Gen. Eng. I and II.

Measurement of mechanical power by means of indicators, dynamometers, etc. Simple experiments in thermodynamic laboratory.

Measurement of electrical power. Simple tests of motors and generators. General electrical measurements.

GENERAL ENGINEERING IV.

This course is for Civil Engineering students of the fourth year, and consists of independent work in the testing laboratories.

GENERAL ENGINEERING V.

Lectures in this course comprise the care, handling, storing, qualities and use of the various explosives used in Engineering works.

ENGINEERING FIELD WORK.

PROFESSORS — A. K. Kirkpatrick, C.E.; Alexander Macphail, B.Sc.; L. Malcolm, M.A., B.Sc.

The classes in this subject are practical, and enable students to become perfectly familiar with the instruments and take charge of the different departments of Surveying work.

ENGINEERING FIELD WORK I.

Students who have completed Surveying I and II or I and VI will be present at the School of Mining, at 10 a.m., Friday, Sept. 2nd, 1910, to commence Field Work, and must procure the prescribed Field Book and draughting material. The class will be under canvas until September 27th, receiving full instruction in practical work in Stadia, Hydrographical, Land, Railway and other branches of Surveying II. The class is under camp organization. The tents, army sheets, camp utensils, etc., are furnished by the School. Each student must provide himself with a pair of heavy blankets or other bedding, draughting instruments, note book, detail, profile, cross section, and tracing paper. The expense of provisions, cooks, and personal transport must be borne by the students, an advance of $20.00 being made to cover same.

Throughout the work, the class will be in the field daily, and in the evenings must complete notes and draught the day's work. All notes and draughting must be completed by September 27th, 1907, for qualification. Students must notify the Secretary of their intention to attend this class not later than August 15th, 1910, so that all arrangements may be completed before the end of August, 1910. Students should also provide themselves with any Engineers' Field Book, Tables of Logarithms, etc., they may be able to procure.

ENGINEERING FIELD WORK II.

This work is for Civil Engineering students only and will consist of practical work in Railway Location, Switch Problems, and work connected with Bridge and other Surveys. When weather does not permit of outdoor work, the class will be employed draughting the results of the practical work or working of problems.

Qualification based on term work.

Students must provide themselves with Searles' Field Engineering, $3.00.

ENGINEERING FIELD WORK III.

For Civil Engineering students only, consists of practical work in Railway, Structural and Hydraulic Engineering.

When weather does not permit of outdoor work, time alloted will be devoted to the draughting of practical work done, or solution of problems.

Qualification based on term work.

ELECTRICAL ENGINEERING.

PROFESSOR—L. W. Gill, M.Sc.

LECTURER—E. W. Henderson, B.Sc.

I.

Fundamental Principles.

Electro-magnetism and electro-magnetic induction. The magnetic circuit. Induction of electric currents. Power and heat from electric currents. Self and mutual induction. Elementary theory of alternating and direct current generators and motors. Arc and incandescent lighting. Common methods of transmission and distribution of currents. Storage batteries.

II.

Elementary Electrical Engineering.

Measurement of magnetic quantities. Further points in the theory of the magnetic circuit. Hysteresis and hysteresis loss. More advanced theory of self and mutual induction. Laws governing the flow of alternating currents in circuits containing resistance, inductance and capacity. Transformers, their theory, construction and operation.

Elementary laboratory work.

III.

Advanced exercises in drawing, with special attention to electrical apparatus.

Direct Currents.

IV.

Advanced theory of direct current machines. Energy losses, commutation and armature reaction. Series, shunt, and compound machines. Efficiency, operation and control of direct current generators and motors. Theory and practical applications of storage batteries. Boosters. Applications of direct current in commercial work.

Laboratory experiments with standard types of direct current apparatus.

V.

Alternating Currents.

Theory of alternating current generators. Synchronous and induction motors. Rotary converters. Measurement of power in polyphase systems. Phase changing. Multiphase systems. Transmission of power by alternating currents. Applications of alternating current apparatus.

Laboratory experiments with standard types of alternating current apparatus.

VI.

Drawing and Design.

Design of direct and alternating current apparatus.

The student will be required to design and make complete drawings of one or more pieces of apparatus.

VII.

General Electrical Engineering.

This is a special course for students in Mechanical Engineering, and includes the general theory of direct and alternating current apparatus and their applications. The lectures are supplemented by laboratory work.

ELECTRICAL LABORATORIES.

The various laboratories are the Dynamo Laboratories, for testing generators, motors and transformers; and the Standardizing Laboratory, equipped for calibrating meters and instruments of precision.

The Dynamo Laboratories are equipped with standard types of direct and alternating current generators and motors, together with all the necessary accessory apparatus, such as meters, rheostats, etc. The experimental machines are driven by direct connection to motors which receive their power either from the main power plant or from a storage battery, which gives a very steady supply of current often necessary in experimental work.

An important part of the work is the carrying out of commercial tests on various local plants, while in normal operation.

RAILWAY ENGINEERING.

PROFESSOR—A. K. Kirkpatrick.

RAILWAY ENGINEERING I.

Construction.

Lectures comprise: The effects of grades and curves on traffic. Calculations of quantities, overhaul, etc. Duties of resident engineer and his staff on construction. Calculation of progress and final estimates. Records and methods of keeping same. Railway Act of Canada in relation to construction.

Lecture hour—Thursday, 9 a.m.; Friday, 10 a.m.

RAILWAY ENGINEERING II.

Construction.

Lectures comprise: Design of box and arch culverts. Estimation of waterway required. The protection of embankments. Different methods of obtaining and preparing foundations for structures. Pile and frame trestles. Methods of procedure in rock and earth excavations. Tunneling. Ballasting and tracklaying.

Lecture hour—Monday, 10 a.m.

RAILWAY ENGINEERING III.

Maintenance.

The upkeep of track, bridges, and buildings; their inspection and methods of repairs and renewals. The duties and responsibilities of the persons in charge.

Book of Reference:—Railway Track and Track Work by Trackman.

Lecture hour—Wednesday, 11 a.m.

Structures.

General design of railway buildings, *i.e.*, stations, freight sheds, roundhouses, turn-tables; coal handling appliances, sand and water stations, elevators, heating and ventilating of buildings.

Lecture hour—Monday, 9 a.m.

MUNICIPAL ENGINEERING.

PROFESSOR—A. K. Kirkpatrick.
LECTURER—L. Malcolm, M.A., B.Sc.

MUNICIPAL ENGINEERING I.

Water Supply.

Lectures comprise: Municipal water supply. Rainfall. Source of supply. Quantity, quality and purification of water. Distribution, designing, and details of construction. Domestic systems.

Lecture hour—Thursday, 10 a.m. 2nd Term.

MUNICIPAL ENGINEERING II.

The Collection and Disposal of Sewage and Refuse.

Lectures comprise: The various systems of collection and removal of sewage. Design. Consideration of rainfall, run off, and water consumption. Proportioning of size. Grades and flow in sewers. Methods of construction and materials used. Plumbing. Maintenance of sewer systems, including ventilation, flushing, and inspection. Assessments.

Sewage disposal. Methods employed. Design, construction, and maintenance of the various systems, including bacterial treatment. Refuse disposal. Kinds of refuse. Methods of collection and disposal and economic value of same. Incinerators.

Lecture hour—Tuesday, 10 a.m.

MUNICIPAL ENGINEERING III.

Roads and Streets.

Lectures comprise: Country and city roads and pavements. Lay out, grades, and roadbeds. Various kinds of pavements and methods of construction. Cost and durability. Gutters, curbs, and gullies. Various kinds of walks, methods of construction, materials used. Methods of dust prevention. Construction with street railway track. Methods of assessment.

Lecture hour—Wednesday, 10 a.m.

Municipal Engineering II and III include field work, three hours per week, Saturday, 9 to 12. Projects in sewer designs and paving are set and completed during these hours; as far as possible each student being given separate problems. A time limit is set with each problem.

MUNICIPAL ENGINEERING IV.

City and Highway Bridges and Electric Railways.

Aesthetic design of bridges of different types; details of construction. Determination of loads and analysis of stresses taken under General Engineering II. Electric Railways—Subgrade, rails, ties, curves, switches, pavements, power, grades, and bridges.

Lecture hour—Thursday, 10 a.m. 1st Term.

HYDRAULIC ENGINEERING.

PROFESSORS—Alexander Macphail, B.Sc.; A. K. Kirkpatrick.

Comprises the study of Hydraulics, Canals, Harbors, River Improvements, Water Power, Irrigation, etc.

HYDRAULIC ENGINEERING I.

PROFESSOR—Alexander Macphail, B.Sc.

Hydraulics.

Application of hydrostatic pressure in the case of dams, gates and pipes. Flow of water and measurement of its volume by various orifices and weirs. Flow in open channels, streams, ditches, flumes, etc., and the use and application of these conductors of waters. Flow through tubes and pipes. Use of pipes as conductors of supply for domestic and power purposes. Dynamic and static pressure as applied to motors for power purposes. The efficiency of various water wheels, turbines, etc.

Lecture hours—Tuesday and Thursday, 10 a.m.
Text-book:—Merriman's "Hydraulics."

HYDRAULIC ENGINEERING II.

PROFESSOR—A. K. Kirkpatrick.

Canals, Harbors and River Improvements.

Canals.—Economy in design of dimensions, based on traffic. Determination of cross section of canal. Materials required for banks, and method of construction. Dredging, blasting and improvements of existing water-ways. Design of locks, gates, controlling mechanism, etc. Hydraulic lifts.

Harbors.—Advantageous characteristics. Construction of piers, lighthouses, breakwaters, etc. Dredging, blasting, etc., for channels. Buoys, channel marks and range lights.

River Improvements.—Dredging of existing water-ways for navigation. Protection of channels, etc.

Lecture hour—Tuesday, 2 p.m.

Boof of Reference:—Watt's Improvement of Rivers.

HYDRAULIC ENGINEERING III.

PROFESSOR—A. K. Kirkpatrick.

Water Power.

Natural watercourses. Dams for water power. Construction of earthen, loose rock and masonry dams and appendages. Storage reservoirs. Spill-ways and outlet sluices. Development of natural water powers. Transmission of power. Measurement of water power. Turbines and water wheels.

Design of hydraulic power plants.

Lecture hours—Tuesday, 11 a.m.

Book of Reference:—"Water Power," Jos. P. Frizell.

HYDRAULIC ENGINEERING IV.

PROFESSOR—A. K. Kirkpatrick.

Irrigation.

Hydrography. Precipitation, runoff, and stream flow. Evaporation, absorption and seepage. Alkali drainage and sedimentation. Subsurface water sources and sewage for irrigation. Irrigation canals. Classes of irrigation works, alignment, slope and cross-section headworks, and diversion weirs, regulators and escapes. Distributaries. Application of water and pipe irrigation. Estimates.

Lecture hour—Wednesday, 1 p.m.

Book of Reference:—Irrigation Engineering, H. M. Wilson.

STRUCTURAL ENGINEERING.

PROFESSORS—A. K. Kirkpatrick; Alexander Macphail, B.Sc.

Students about to take Structural work should have completed Mathematics I and II, and General Engineering I.

STRUCTURAL ENGINEERING I.

Building Construction.

Selection of building materials, stone, wood, brick, etc. Foundations of buildings, walls, etc. Design of floors, floor beams, walls, roofing materials and other parts of buildings. Joints in wood, stone and iron.

Stone cutting and masonry. Concrete and reinforced concrete.

Students will be required to make independent designs of the various structures dealt with in the lectures.

Lecture hour—Tuesday, 2 p.m.

STRUCTURAL ENGINEERING II.

Bridge Engineering.

Lectures comprise: Examination of bridge site; economic number of spans and piers. Selection of truss or trusses.

Wooden and steel trestles, etc.

Design of foundations, abutments and piers.

Coffer dams and caissons.

Approaches. Ice breakers, etc.

Flooring. Hand railings. Guard rails. Stringers, floor beams, ties, etc.

Shop work and assembling.

Specifications, details, estimates and bills.

Two hours per week will be devoted to design of structures.

Lectures—Wednesdays, 9 a.m.

STRUCTURAL ENGINEERING III.

Design of Structures.

Lectures will comprise the design of details in Bridge trusses and other structures, and the practical application of General Engineering I and II.

Projects will be given to the class in Roof and Bridge Design according to Standard Specifications usually consisting of a plate girder, rivetted truss, pin-connected truss, etc., which must be executed during the four hours allotted to this branch, complete stress sheets, working drawings, estimates, etc., being required.

Qualification will be based on term work.

Lecture hour—Tuesday, 8 a.m.

Text-books:—Merriman's Roofs and Bridges. Pts. I-IV.
"Cambria Steel" Hand-book.

MECHANICAL ENGINEERING.

Professor—F. O. Willhofft, M.E., A.M.
Lecturer—W. C. Way, M.Sc.

I.

Machine Design.

Simple and compound stresses. Allowable stress under various conditions. Straining actions in machines. Elementary principles of design. Application of principles to the design of bolts, springs, riveted joints, cotters, thin and thick shells, cylinders, flat plates, shafting and couplings. Shrinkage and forced fits. Belting, ropes, pulleys and gearing.

Two lectures per week for Mechanical and Electrical Engineers.

II.

Dynamics of Machines.

Friction and lubrication. Journals and bearings. Dynamics of rotation, pivots. Dynamics of wedges, cotters, and screws, taking friction into account. Elementary dynamics of the steam engine, fluctuation of crank effort. Speed and energy of flywheels. Brakes, dynamometers. Balancing of engines. Governors. Centrifugal machines.

Two lectures per week and elementary laboratory work in Experimental Engineering, for Mechanical and Electrical Engineers.

III.

Machine Drawing.

Advanced work in drawing. Design of simple machines. Problems in kinematics.

Three afternoons per week for Mechanical Engineers.

IV.

The Elements of the Power Plant.

Fuels and combustion. Transfer of heat. Heating Surface. Generation of steam. Chimneys. Artificial draft. Smoke prevention. Mechanical stoking. Coal handling. Use of superheated steam. Feedwater heaters. Condensing systems. Pumping machinery. Compressed air. Gas and oil engines. Gas producers.

Two lectures per week for all engineering students.

V.

Advanced Machine Design.

Design of special machinery. Valve gears and governors, for gas and steam engines. Vibrations in machines. Balancing problems.

Two lectures per week and two afternoons in draughting-room during the first term, for Mechanical Engineers.

VI.

Engine Design.

Design of steam engines and gas engines, steam boilers and gas producers.

One lecture per week and one afternoon in draughting-room for Mechanical Engineers.

VII.

Mechanism.

A study of link work; wrapping connectors; velocity diagrams of various forms of mechanism; conditions and examples of rolling contact and sliding contact; design of cams; outlines of gear teeth; trains of gears and pulleys.

One lecture per week illustrated by working models, for all engineering students; also one afternoon per week in draughting-room, for Mechanical Engineers only.

VIII.

Technology of Fuels.

Discussion of fuels, gaseous, liquid and solid, with respect to their suitability for power generation. Gas and fuel analysis for engineers. Calculation and calorimetric determination of the heating value of fuels. Gas analysis in connection with the operation of steam boilers. Gas engines and gas producers. Physical tests of lubricants. Causes and prevention of boiler scale. Treatment of feedwaters.

A series of lectures in combination with laboratory work for Electrical and Mechanical Engineers.

IX.

Power Plant Design.

Lay-out and specifications of complete plants for steam, gas, and water power. Elements of ventilation and heating.

Two lectures per week and two afternoons in draughting-room during second term, for Mechanical Engineers.

Automobile Engineering.

This course has been added in 1909-10, and is considered valuable on account of the increasing importance of the automobile industry. A thorough study is made of the design, construction and operation of the various types of automobiles. It includes a critical discussion of engine, carburetters and carburation, ignition systems, transmissions, differentials, cooling systems, framework, steering gear, etc.

A complete chassis of a 40 H.P. touring car, kindly lent to the Department by the makers, the McLaughlin Motor Car Co., was used during the session of 1909-10. At least one car will be procured each year if possible, and at the same time other makes, such as can be found in the city, will be studied. Road tests will be made whenever possible. Attention will also be given to aeroplanes and dirigible balloons.

POWER PLANT ECONOMICS.

Professor—L. W. Gill, M.Sc.

Various types of power plants. Economy of different types of boilers, engines, pumps, generators, etc. Relation of the various elements to the economy of the plant as a whole. Effect of industrial conditions, operating conditions, and cost of fuel on design. Power plants with different types of prime movers. Combined heating and power plants. Cost of various types of power plants; operating expenses; fixed charges; depreciation, etc.

DESCRIPTIVE GEOMETRY.

Professor—Alexander Macphail, B.Sc.
Lecturer—W. C. Way, B.Sc.

This subject deals with the methods of representing objects on one or more planes so that the relative positions of the various parts can be clearly represented to the eye, and accurately determined by measurement. It deals with the various methods employed in the graphical solution of many problems arising in engineering design, and generally with the principles underlying all constructive drawing. The main object of the work is to develop the faculty of mentally picturing the relative positions of the different parts of a machine or structure, an essential process in all constructive work.

The work consists of one lecture per week, and two hours per week devoted to the working out of problems in the draughting room. The problems deal with the straight line and plane and solid figures, intersection of plane and curved surfaces, axometric projections and linear perspective.

Text-book:—Elements of Descriptive Geometry. (Millar).

DRAWING.

PROFESSOR—A. K. Kirkpatrick.

LECTURERS—W. C. Way, M.Sc; E. W. Henderson, B.Sc.

DRAWING I.

The lectures and practical work are arranged with a view to preparing students for the subjects of Mechanical Drawing, Descriptive Geometry, etc., in the different branches of Engineering.

Each student at the opening of the term must provide himself with a set of drawing instruments, scales, set squares, T square, thumb tacks, pens, pencils, inks and drawing paper of approved standard.

Attendance of at least five hours a week is required, and students must arrange for these at commencement of term.

The class standing will be based on the term work.

The lectures will comprise: Practical Geometry of the line, circle, ellipse, parabola, hyperbola, spirals, cyloids, etc.; simple projection of planes and solids; lettering, etc.

Problems will be assigned to the class in the form of plates.

Book of Reference:—Rawles' Practical Geometry.

Lecture hour—Thursday, 1 p.m.

DRAWING II.

Elementary principles of Mechanical Drawing. Sketching. Preparation of working drawings of valves, simple parts of machines, etc. Tracing and blue-printing.

The student is required to make dimensioned sketches of machine parts, and from these sketches make drawings.

DRAWING III AND IV.

Extension of work taken up in Drawing II.

SURVEYING.

PROFESSOR—Alexander Macphail, B.Sc.
ASSISTANT—L. Malcolm, M.A., B.Sc.

All branches of Surveying receive full consideration. During the outdoor instruction students are given every opportunity to become familiar with the instruments. Notes of all field work are plotted in the draughting-room, and the rules and regulations for field work and instrument-room must be strictly adhered to. Students must be engaged in the work of a class in the hours set apart for it, otherwise their attendance will not be counted.

SURVEYING I.

Lectures in Second Term.

These comprise: Description, use and adjustment of chains and tapes. Use and adjustment of level, compass, and transit. Elements of levelling and land surveying.

Exercises are required in this work, as the practical part of each class is taken into account for the term's work.

Text-book:—Pence & Ketchum's Surveying Manual.

Lecture hour—Friday, 9 a.m. Second term.

SURVEYING II.

For Second Year Students in Civil Engineering and Power Development.

Lectures comprise: Adjustment and use of instruments. Mapping—Symbols, and general arrangement, plotting. Railroad Surveying—Curves, curve problems in location, levelling, profiles, elements of switchwork. Topographical Surveying—with stadia, plane table, hand-level, and transit and level. Uses and adjustment of these various instruments. Reconnaisance and simple triangulation. Hydrographic Surveying—Methods; sextant; river surveying; stream flow. Land Surveying—Transit, compass and chain. Resurveys, irregular boundaries, special problems, determination of azimuth, and latitude. Laying out of building, and engineering construction. Earthwork. Discussion of errors.

Lecture hours—Monday, 9 a.m.; Wednesday, 11 a.m.

Field work—Friday, 1-4 p.m.

Text-books:—Searles' Field Engineering.
Pence & Ketchum's Handbook for Surveyors.

SURVEYING III.

This course is for second year students in Civil Engineering and Power Development. Consists of three hours per week practical work in Land, Municipal, and Railway Surveying. The class, when not engaged in outdoor work, meets in the class or draughting room for consideration of problems, given from time to time. The date will be set as to when problems must be completed, and no problem will be accepted after the expiration of the time set for its completion. The attendance and class-work as well as the completed plans and problems will be considered in the class standing.

Hours—2-5 p.m., Monday.

Text-book:—Searles' Field Engineering.

SURVEYING IV.

Lectures.

For Civil Engineering Students only.

Dominion Land Surveying—Comprising the methods adopted in Survey of Dominion Lands, as laid down in Manual of Survey, issued 1903, by the Dominion Government. Provincial Land Surveying.

Geodesy.—Comprising the principles and methods of procedure in extended triangulation. Determination of Latitude, Azimuth, and Time. Angular Levelling.

Mine Surveying.—Principles involved in Mine Surveys, and problems connected with underground work.

Photographic Surveying.—Principles involved. Field work. Mapping.

Lecture hour—Fridays, 11 a.m.

Books of Reference:—Manual of Survey for D.L.S.
Johnson's Surveying.

SURVEYING V.

This course is for Civil Engineering students of the Third Year. Advanced practical work in Land, Municipal, Railway and Construction Engineering will be given. Problems will be set on Transition Curves, Vertical Curves, Earthwork, Location and lay-out of buildings, culverts, Switchwork. Separate problems will be given

as far as is possible. The same regulations govern this as govern Surveying III.

Hours—2-5 p.m., Tuesday.

SURVEYING. VI.

This course is for Second Year students in Course A, Mining Engineering.

Lectures comprise: Use and adjustment of instruments. Mapping—symbols, plotting, angles. Elements of Railway Engineering—curves, levelling, profiles. Elements of switchwork. Topographic Surveying—stadia, plane table, hand-level, and level. Adjustment of the above; mapping. Hydrographic Surveying—methods, sextant, river surveying. Earthwork, cross sections, stadia methods.

Lecture hour—Thursday, 9 a.m.

Field work—Wednesday, 2-5 p.m.

Text-book:—Special Notes.
Pence & Ketchum's Surveying Manual.

SURVEYING VII.

For Mining Engineering Students only.

Dominion Land Surveying—Comprising the methods adopted in Survey of Dominion Lands, as laid down in Manual of Survey, issued 1903, by the Dominion Government. Determination of Latitude, Azimuth and Time.

Mining Engineering—Principles involved in Mine Surveys, and problems connected with underground work.

Topographic Surveying—Extension of work taken in Surveying VI.

Lecture hour—Friday, 11 a.m.

Books of Reference:—Manual of Survey, D.L.S.
Johnson's Surveying.

ECONOMICS.

A course of lectures on Economics with special reference to the needs of students in Practical Science will be given by Professor Skelton and Professor Swanson. The course will comprise a general outline of ecoonmic principles with special reference to transportation, exchange, the nature and organization of joint stock companies and the various forms of corporate securities, taxation, municipal ownership and trade unionism.

SHOP WORK.

INSTRUCTORS—J. Connell, Machine Shop; R. Bunt, Blacksmith Shop; ....., Pattern Shop.

Students in all courses except F and G will be given a course of practical work in the workshops of the School as per schedule of courses.

A student entering in 1908, or later, in either course F or G, shall enter any commercial works approved by the School and take a special course of shop training extending over a period of thirty-six weeks (18 weeks between second and third, and 18 weeks between third and fourth college years); or, in case accommodation can not be secured, he shall attend a special course in the workshops of the School, extending over a period of 8 weeks (4 weeks preceding his third college year and 4 weeks preceding his fourth college year).

To ensure that as many students as possible will have an opportunity to obtain their shop training in commercial works, arrangements have been made with the management of several of the large manufacturing establishments, so that the students who have completed their second year, may enter upon a suitable course of shop training and receive such remuneration as will more than cover their expenses. In this case the student must present a certificate from the manager of the works in which he has carried out his practical work, stating the character of the work done and the amount of time spent in the various departments.

A complete forge shop has been added to the equipment, so that now efficient instruction can be given in woodworking and pattern-making, in machine shop practice, and in blacksmithing. The forge shop is located in the basement of the workshop building, and is equipped with the latest types of down-draft forges, and electric drive for the blower and exhauster.

GIFTS OF REPORTS, PERIODICALS, ETC.

1909.

Canadian.

Presented by Mr. R. J. McDowall, B.Sc.

Presented by Dr. Leo F. Guttmann.

Journal of the Chemical Society, 1910.

Twenty Years' Progress in Explosives, by Dr. Oscar Guttmann.

Geological Survey of Canada, Ottawa.

Report of Mining and Metallurgical Industries of Canada, 1907-8.
Report of various districts in Canada.
Catalogue of Publications.

Department of Mines.

Report of Iron Ore Deposits on the Ottawa.
Production of Coal, Iron, and Natural Gas.

Department of Labour.

Report, 1907-8.

Department of Marine and Fisheries.

Canadian Biology, 1902-5.

Royal Commission, Quebec Bridge.

Report, 1908.

Auditor-General.

Report for year ending March 31, 1908.

Bureau of Mines, Ontario.

Report, Vol. 16 ,17.

Department of Mines, British Columbia.

Official Bulletins, 10, 22.

Nova Scotia Mining Society.

Journals, Vols. 6, 8, 12, 13.

British and Colonial.

Great Britain.

Geological Survey of the United Kingdom.
Summary of Progress, 1908.

New South Wales.

Report of Secretary for Mines, 1908.
Mineral Resources, No. 6.
Official Year Book, 1907-8.

Western Australia.

Report of the Department of Mines, 1908.
Statistical Register, 1907.
Golden Mile Development, 1908.

Queensland.

Department of Mines, Publication No. 215.

South Australia.

Review of Mining Operations for year ending Dec. 31, 1908.
Report of Recent Mineral Discoveries, 1908.
Department of Intelligence, Bulletin No. 8.

Victoria.

Annual Report of Secretary for Mines, 1908.

New Zealand.

Bulletins of the Geological Survey, Nos. 5, 6, 7.
Official Year Book, 1908.
Forty-second Annual Report of the Dominion Laboratory.

Tasmania.

Report of Secretary for Mines, 1908.

India.

Records of Geological Survey, Vol. XXXVII, Pts. 2, 3, 4; Vol. XXXVIII, Pts 1, 2.

Transvaal.

Annual Report of Mines Department for year ending June, 1908.
Memorandum of Iron and Steel Industry of the Transvaal, 1908.

American and Foreign.

United States Geological Survey.

Folios 160-166.
Bulletins 341, 347, 352-6, 358-9, 361-376, 378-9, 383, 385, 387-8, 392-4, 401-3, 412, 423.
Water Supply and Irrigation Papers, 221-6, 228-232, 234-5, 242.
Professional Papers, 58, 60-1, 63-4, 66.

Smithsonian Institute.

Annual Report, 1907.

Georgia.

Geological Survey Bulletins 2, 5A, 6A, 11.

Illinois.

Report of Bureau of Labour, 1908.
Twenty-seventh Annual Coal Report, 1908.

Iowa.

Geological Survey Annual Report, Vol. XVIII, 1907.

New Jersey.

Annual Report of State Geologist, 1908.

New York.

Education Department.

Annual Report, 1908.
Education Law, 1909.
Bulletins 448, 457-9.

Report of 8th Annual Conference of Sanitary Officers.

State Museum.

Report, Vol. 61, Pts. 1, 2, 3.
Bulletins 123, 126-7, 133.

Ohio.

Geological Map.

Wisconsin.

Geological Survey,Bulletin 20.

American Institute of Mining Engineers.

Transactions, Vol. XXXIX.

Mexico.

Parergones del Instituto Geologico, Tome II, Nos. 7, 8, 9; Tome III, Nos. 1, 2.
Boletin Geologic 17, 26.

Brazil.

Servico Geologico, Final Report.

Also the current Volumes as issued of:

The School of Mines Quarterly.
Forestry Quarterly.
Journal of the Society of Western Engineers, Chicago.
Proceedings of the American Society of Civil Engineers.

Proceedings of the Engineers' Society of Western Pennsylvania.
The Canadian Engineer.
Engineering, London.
Cement and Engineering News, Chicago.
Industrial Advocate, Halifax.
Mines and Minerals, Scranton, Pa.
Mining Science, Denver, Col.
B. C. Mining Record, Victoria, B. C.
New Zealand Mines' Record.
The Mining World, Chicago.
The Canadian Patent Office Record.
Inland Revenue Bulletin.
Labour Gazette.
The Illustrated Journal of Patents, London.
Diplomatic and Foreign Reports, Foreign Office, London.
    Annual Series.
    Treaty Series.
    Miscellaneous Series.
Labour Gazette, London.
West Indian Bulletin.
Monthly Report Chamber of Mines, West Australia.
Consular Reports, Washington.
Special Consular Reports.
Bulletin Department of Labour.
North Carolina Bulletin of Agriculture.
Experimental Station Record, Washington.

ENGINEERING SOCIETY.

The representative student organization of the Faculty of Applied Science is the Engineering Society.

This society exists for the purpose of dealing with all matters concerning the Science students. All students taking an Engineering course by virtue of their registration are members of the society. Students taking a Science course in Arts are eligible for membership.

The annual meeting takes place in October within one week after the election of officers for the ensuing year. Regular fortnightly meetings are held at which papers of interest to Science students are read by student members of the society, Professors and practising engineers.

It is through this student society that the conduct of the Science students is regulated. The Vigilance Committee, which acts as the "court," has one or more sittings a year, when all offenders against written or unwritten laws are dealt with. This Vigilance Committee is directly responsible to the Engineering Society, and its officers are elected yearly.

The Engineering Society issue an Annual Directory containing a full list of students and graduates, together with their present address and occupation and experience in the different branches of Engineering.

The Extension Scheme and The Information and Employment Bureau, through the permanent secretary, Mr. G. J. MacKay, keep the graduates in touch with the School and, as far as possible, secure positions for both students and graduates.

The officers of the Engineering Society for the year 1909-1910 are as follows:—Hon. President, Professor A. Macphail; President, A. A. MacKay; 1st Vice-President, J. V. Dobson; 2nd Vice-President, A. M. Kirkpatrick; Secretary, W. S. Earle; Treasurer, E. F. Gibson; Committee—F. A. Bell, '10; T. S. Mills, '11; A. D. Carmichael, '12; R. M. Cameron, '13.

The annual dinner, held in Grant Hall in the beginning of December, and the annual dance, held after the Christmas holidays, are the chief functions of the society. Prominent engineers are invited to the dinner as guests of honor for the evening. Their after-dinner speeches are eagerly listened to by the younger aspirants to eminence in the engineering profession.

The Engineering Society have also installed a Bookstore at which practically all Science text-books and supplies may be secured at reasonable rates.

Officials of Vigilance Committee for '09-'10 are::—Senior Judge, J. H. Rose; Junior Judge, J. B. Stirling; Senior Prosecuting Attorney, W. J. Fletcher; Junior Prosecuting Attorney, W. G. Hughson; Sheriff, R. M. MacKenzie; Clerk, R. Bartlett; Crier, A. L. Lewis; Chief of Police, ... Constables—'10, H. G. Bertram, J. L. Stanley; '11, N. B. Davis, H. Ramsay; '12, C. Attwood, W. Alderson; '13, R. Clarke, W. Manhardt.

GRADUATES.

In the list are included graduates in the Faculty of Practical Science (B.Sc. and M.E.) and those graduates in Arts (B.A., M.A. and D.Sc.) since 1887, who after graduation have devoted themselves to scientific pursuits.

Graduates will confer a favor by forwarding changes of address to the Secretary.

Name.	Date of Graduation.	Occupation and Address.
Agassiz, W. G. S., B.Sc.	1909	Kingston.
Akins, J. R., B.Sc.	1907	Topog. Survey, Ottawa.
Alder, W. R., B.Sc.	1907	Prescott.
Anson-Cartwright, R. H. M., B.Sc.	1904	34 Dundonald St., Toronto.
Bailie, A. A., B.Sc.	1906	Billings' Bridge.
Baker, C. W., B.Sc.	1905	Can. Westinghouse Co., Hamilton, Ont.
Baker, H. S., B.Sc.	1902	Box 424 Niagara Falls South, Ont.
Baker, J. C. B.Sc.	1903	Vermilion, Alta.
Baker, M. B., B.A., B.Sc.	1902	Professor, Geology, School of Mining, Kingston.
Baker, Wm. C., M.A.	1895	Lecturer in Physics, School of Mining, Kingston.
Bartlett, J., B.Sc.	1907	University Ave., Kingston.
Bateman, G. C., B.Sc.	1905	T. & H. B. Mines, Cobalt, Ont.
Bell, James M., M.A.	1899	Director Geological Survey of New Zealand, Wellington, N.Z.
Berney, K. C., B.Sc.	1906	Can. Westinghouse Co., Montreal.
Blenkhorn, S., B.Sc.	1909	Deloro, Ont.
Bolton, L. L., M.A., B.Sc.	1906	Mines Dept., L. Superior Corporation, Sault. Ste. Marie.
Bowen, N. L., B.Sc.	1909	572 Massa. Ave., Boston, Mass.
Brewster, F. A., B.Sc.	1909	Banff, Alta.
Brock, Reg. W., M.A.	1895	Geological Survey, Ottawa.
Brown, E. W., B.Sc.	1908	Box 706, Cobalt.
Browne, P. J., B.Sc.	1909	care B. C. Copper Co., Greenwood, B.C.
Brown, T., B.Sc.	1904	Surveyor and Assayer, Buffalo Mines, Cobalt.
Bruce, E. L., B.Sc.	1909	Can. Copper Co., Copper Cliff, Ont.
Burrows, A. G., M.A., B.Sc.	1902	Bureau of Mines, Toronto.
Cairns, D. D., B.Sc. 1905, M.E.	1906	Geologist, Geol. Survey, Ottawa.
Calvin, J. D., B.A., B.Sc.	1907	Kingston.
Campbell, A. S., B.Sc.	1907	288 Queen St., Kingston.
Campbell, T. D., B.Sc.	1909	Perth.
Campbell, W. M., B.Sc.	1909	Eganville.

Name.	Date of Graduation.	Occupation and Address.
Carmichael, J. E., B.Sc.	1909.	Kingston.
Carr-Harris, A., B.Sc.	1906.	Cananea, Sonora, Mexico.
Cartwright, C. T., B.Sc.	1905.	care Snowshoe Mines, Phoenix, B.C.
Cavers, T. W., B.Sc.	1904	Tennessee Copper Co., Copperhill, Tenn.
Chartrand, D. E., B.Sc.	1909.	61 Church St., Ottawa.
Code, E. S. L., B.Sc.	1907	914 Wallace Ave., Wilkinsburg, Pa.
Code, L. B., B.Sc.	1906.	223 Harris St., Vancouver, B.C.
Collins, E. A., B.Sc.	1905.	Mining Engineer, Massey Station, Ont.
Connell, F. M., B.Sc.	1906.	Haileybury.
Cooper, R. H., B.Sc.	1909.	Antigonish, N.S.
Cordukes, J. P., B.Sc.	1908.	Topog. Survey, Ottawa.
Corkill, E. T., B.Sc. 1904, M.E.	1905.	Bureau of Mines, Toronto.
Craig, H. B. R., B.Sc.	1903	City Engineer, Kingston.
Craig, J. D., B.A., B.Sc.	1900.	Dept. of Interior, Ottawa.
Cumming, A. L., B.Sc.	1905	Topographical Survey, Ottawa.
Cummings, A. B., B.Sc.	1908.	Box 163, Fernie, B.C.
Currie, P. W., B.Sc.	1907	Dept. of Interior, Ottawa.
Curtin, C. J., B.Sc.	1907.	Amparo Mining Co., Etzatlan, Jalisco, Mexico.
Daley, J. C., B.Sc.	1909.	129 Besserer St., Ottawa.
Dempster, H. O., B.Sc.	1908.	Gananoque, Ont.
Dennis, E. M., B.Sc.	1904.	Surveyor, Topog. Survey, Ottawa.
Dickson, C. W., M.A.	1900.	Lecturer, School of Mining, Kingston.
Dobbs, G. G., B.Sc.	1906.	Box 97, Bessemer, Alabama, U.S.
Donnelly, John, jr., M.E.	1898.	Hydraulic and Mining Engineer, Kingston.
Drury, C. W., B.Sc.	1909.	110 Madison, Elizabeth, N.J.
Dwyer, E., B.Sc.	1902.	Care of Westinghouse Co., Hamilton.
Dwyer, W. O., B.Sc.	1909.	79 Johnston St., Kingston.
Fairlie, M. F., B.Sc.	1902.	Cobalt.
Fairlie, T. U., B.Sc.	1905.	Parry Sound.
Ferguson, M. U., B.Sc.	1905.	City Engineer, Stratford.
Findlay, A. B., B.Sc.	1908.	Winnipeg, Man.
Finlayson, M. D., B.Sc.	1903.	Grand River, N.S.
Finnie, H. V., B.Sc.	1906.	Lachine Locks, Que.
Fleming, A. A., B.Sc.	1908.	Box 171, Hull, Que.
Fleming, D. B., B.Sc.	1908.	268 Thomas St., Peterboro.
Fleming, H. K., B.Sc.	1909.	Craigleith, Ont.
Fortescue, Charles L., B.Sc.	1898.	Westinghouse Co., Pittsburg, Pa.

Name.	Date of Graduation.	Occupation and Address
Fox, Charles B., M.A.	1895.	Superintendent Pittsburg Reduction So., East St. Louis, Ill.
Gage, R. G., B.Sc.	1905.	911 N. Vermilion St., Danville, Ill.
Germain, H. A., B.Sc.	1907.	Elect. Co., Pittsfield, Mass.
Gleeson, J. V., B.Sc.	1904.	123 King St. W., Kingston.
Gleeson, L. J. B.Sc.	1907.	Irrigation Dept., Ottawa.
Gordanier, W. N., B.Sc.	1903.	Electron, Wash.
Graham, S. N., B.Sc.	1900.	Kingston.
Grant, A. M., B.Sc.	1908.	Topog. Survey, Ottawa.
Grant, J. R., B.Sc.	1905.	30 Church St., N.Y.
Grover, G. A., B.Sc.	1902.	Osgoode Hall, Toronto.
Guess, George A., M.A.	1894.	Chem. Cons. Copper Co., Cananea, Sonora, Mexico.
Guess, H. A., M.A.	1895.	Flat River, Missouri.
Harding, W. M., B.Sc.	1908.	Box 653, Oshawa.
Hays, C. L., B.Sc.	1909.	Port Colborne, Ont.
Hazlett, J. W., B.A., B.Sc.	1903.	(Deceased).
Henderson, E. W., B.Sc.	1905.	Lecturer in Electrical Engineering, School of Mining, Kingston.
Herriot, G. H., B.Sc.	1907.	Lecturer in Mathematics, School of Mining, Kingston.
Hill, Jas., M.A., B.Sc.	1908.	Deloro, Ont.
Houston, D. W., B.Sc.	1907.	Tabor, Iowa.
Huber, W., B.Sc.	1908.	Crown Reserve Mines, Cobalt.
Instant, Reginald, B.A.	1895.	Manager Corundum Refineries, Palmer's Rapid's, Ont.
Irwin, R. T., B.Sc.	1907.	Norwich.
Jackson, G. J., B.Sc.	1909.	care Cleveland & Cameron, Vancouver, B.C.
Jackson, H. G., B.Sc.	1903.	Trans. Railway, St. Boniface, Man.
Jeffery, J. J., B.Sc.	1908.	Elder's Mills.
Jeffery, R. T., B.Sc.	1908.	Elder's Mills.
Jenkins, G. A., B.Sc.	1909.	Hand Hills P.O., Alta.
Jenkins, W. E., B.Sc.	1907.	Box 1627, Edmonton, Alta.
Johnston, W. A., M.A., B.Sc.	1905.	Geol. Survey, Ottawa.
Keith, G. C., B.Sc.	1907.	435 Grace St., Toronto.
Kelso, J. A., B.Sc.	1909.	Wallacetown.
Kilburn, D. G., B.Sc.	1907.	T. & N. O. R'y, Cochrane, Ont.
Kilburn, G. H., B.Sc.	1909.	Stratford, Ont.
King, J. A. S., B.Sc.	1909.	Milton, Ont.
King, J. L., B.Sc.	1907.	886 Hornby St,. Vancouver.
Kirkpatrick, Guy H., B.Sc., E.M.	1898.	care Lady Kirkpatrick, 38 Hyde Park Gate, London S.W., Eng.

Name.	Date of Graduation.	Occupation and Address.
Knight, C. W., B.Sc.	1903.	Bureau of Mines, Toronto.
Lavoie, E., B.Sc.	1907.	Asst. Eng. Ha-Ha Bay Ry., Chicoutimi, Que.
Lawson, W. E., B.Sc.	1909.	Geol. Dept., Ottawa.
Lazier, F. S., B.Sc.	1907.	Trent Canal, Frankford.
Lennox, J. S., B.Sc.	1906.	501 North St., Pittsfield, Mass.
Lodge, W. L., B.Sc.	1903.	State Agric. Coll., Lansing, Mich.
Longwell, A., B.A., B.Sc.	1903.	Canadian Laboratories, Toronto.
Mabee, Horace C., B.Sc.	1898.	Berry Bros., Detroit, Mich.
Malcolm, L., M.A., B.Sc.	1907.	Lecturer in Civil Engineering, School of Mining, Kingston.
Malloch, G. S., B.A., B.Sc.	1906.	Geol. Survey, Ottawa.
Malone, E. E., B.Sc.	1904.	Asst. Engineer, Trent Canal, Newmarket.
Marshall, J. H. G., B.Sc.	1908.	Stella.
Matheson, H., B.Sc.	1907.	Geol. Survey, Ottawa.
Merritt, Charles P., B.Sc.	1899.	(Deceased).
Millar, T. R., B.Sc.	1906.	Box 34, Niag. Falls Centre, N.Y.
Milliken, J. B., B.A., B.Sc.	1908.	Topog. Survey, Ottawa.
Montgomery, O. M., B.Sc.	1905.	2900 Converse Ave., E. St. Louis, Ill.
Murphy, A. A., B.Sc.	1907.	Portland, Ont.
Murray, C. W.	1907.	Mission City, B.C.
Murray, J. C., B.A., B.Sc.	1901.	Ed. Can. Mining Journal, Toronto.
McArthur, F., B.Sc.	1907.	City Engineer, Yorkton, Sask.
McCallum, H. E., B.A., B.Sc.	1903.	(Deceased).
MacClement, Wm. T., M.A.	1903.	Prof. of Botany, Queen's University.
McColl, C. R., B.Sc.	1908.	care O. McKay, Walkerville, Ont.
McCulloch, R. O., B.Sc.	1907.	Souris, Man.
McDiarmid, S. S. R., B.Sc.	1903.	41 Flack Block, Vancouver, B.C.
Macdonald, Geo., B.A., B.Sc.	1878.	(Deceased).
McEwen, D. F., B.Sc.	1907.	912 Hornby St., Vancouver, B.C.
McGinnis, T. C., B.Sc.	1909.	Belleville.
McGinnis, W. C., B.Sc.	1908.	Belleville.
MacIlquham, W. L., B.Sc.	1905.	Topog. Survey, Ottawa.
McIntosh, J. S., B.Sc.	1909.	Iroquois, Ont.
Mackenzie, G. C., B.Sc.	1903.	Kingston.
McKay, B. R., B.Sc.	1908.	Walker Museum, Chicago University, Ill.
McKay, G. J., B.Sc.	1907.	Asst. in Mining and Metallurgy, School of Mining, Kingston.
McKay, R. B., B.Sc.	1904.	Cobalt, Ont.

Name.	Date of Graduation.	Occupation and Address
Mackenzie, Arch. A., B.A., B.Sc.	1877	Osaki, Japan.
McKenzie, H. A., B.Sc.	1907	H. C. Doherty Co., Joplin, Mo.
McKenzie, M., B.Sc.	1908	Box 54, L. Megantic, Que.
Mackie, F. H., B.Sc.	1905	Topog. Survey, Ottawa.
McLaren, G. R., B.Sc.	1907	Magpie Camp, Helen Mines.
McLennan, J. D., B.A., B.Sc.	1902	(Deceased).
McLennan, K. R., B.Sc.	1904	Lindsay, Ont.
McNab, A. J., B.A., B.Sc.	1902	Chem., Trail, B.C.
MacNeill, W. K., B.Sc.	1903	37 Melinda St., Toronto.
Macphail, J. G., B.Sc.	1905	Marine Dept., Ottawa.
McRae, A. D., B.A., B.Sc.	1902	Surveyor, Kingston & Pembroke Railway.
Neilson, A. C., B.Sc.	1909	care Fairbanks-Morse Mfg. Co., Toronto.
Neish, Arthur C., B.A. 1898, M.A.	1900	Demonstrator, Columbia School of Mines, New York City.
Nicol, D. S., B.Sc.	1909	Cataraqui.
Nicol, Wm., M.A.	1889	Prof. of Mineralogy, School of Mining, Kingston.
Noble, D. S., B.Sc.	1902	(Deceased).
Norrish, B. E., B.Sc.	1908	Topog. Survey, Ottawa.
Orford, C., B.Sc.	1908	Delamar, Idaho.
Orr, W. J., B.Sc.	1909	Kingston.
Osborne, J. K., B.Sc.	1909	Cliffs Mining Co., Ishpenning, Mich.
Peeling, C. U., B.Sc.	1909	Campbellford, Ont.
Pense, E. H., B.Sc.	1904	Pub. Works of Canada, Toronto.
Peppard, H. M., B.Sc.	1907	Box 461, Springhill, N.S.
Perry, O. M., B.Sc.	1909	565 Bathurst St., Toronto.
Pinkerton, W. A., B.Sc.	1906	Yorkton, Sask.
Pope, Fred. J., M.A.	1890	Tucson, Ariz.
Potter, R., B.Sc.	1907	City Engineer, Fernie, B.C.
Ransom, F. B., B.Sc.	1909	Deloro, Ont.
Rawlins, J. W., B.A., B.Sc.	1901	Chief Chemist, Canadian Copper Co., Copper Cliff, Ont.
Redmond, A. V., B.Sc.	1903	T. C. Ry., Nepigon.
Reid, F. D., B.Sc.	1904	Coniagas Mines, Cobalt, Ont.
Reid, J. A., B.Sc.	1902	
Richardson, G. T., B.Sc.	1906	Kingston, Ont.
Richmond, D. W., B.Sc.	1908	Brighton.
Ritchie, Geo., B.A., B.Sc.	1878	Toronto.
Robertson, J. J., B.Sc.	1906	Casilla 336, Guayaquil, Ecuador, S.A.
Rockwell, D. B., B.Sc.	1908	Flaherty Syndicate, Port Arthur.

Name.	Date of Graduation.	Occupation and Address.
Rogers, Will C., B.A.	1899	Chemist, Socorro Mine, Chihuahua, Mexico.
Rogers, W. R., B.Sc.	1907	Bureau of Mines, Toronto.
Rose, B., B.Sc.	1909	Iroquois.
Rose, S. L. E., B.Sc.	1903	Springfield Ave., Schenectady, N.Y.
Ryan, F. H., B.Sc.	1909	Newburgh, Ont.
Saint, J. B., B.Sc.	1909	Hill Crest, Vancouver, B.C.
Sands, J. M., B.Sc.	1907	Apartado 125 Tampico, Tampo, Mexico.
Saunders, H. C., B.Sc.	1909	Kingston.
Schofield, S. J., M.A., B.Sc.	1908	572 Massachusetts Ave., Boston, Mass.
Scott, H. H., B.Sc.	1905	Perth.
Scott, J. N., B.Sc.	1909	Wallaceburg.
Scott, O. N., B.Sc.	1903	Consulting Mining Eng., 14 King St. W., Toronto.
Scott, Thomas S., B.A., B.Sc.	1898	Asst. City Engineer, Toronto.
Sears, J., B.Sc.	1905	T. & N. O. Ry., Englehart, Ont.
Shorey, E. C., M.A., 1887, D.Sc.	1897	Bureau of Soils, Dept. of Agric., Washington, D.C.
Shorey, P. M., B.Sc.	1906	Cons. Min. & Smelting Co., Trail, B. C.
Silver, L. P., B.Sc.	1902	420 St. Paul St., Montreal, Que.
Sine, F. L., M.A., B.Sc.	1908	Regina, Sask.
Sloan, D., B.Sc.	1905	Carcross, Yukon.
Smeeton, W. F., B.Sc.	1901	Trout Lake, Ont.
Smyth, W. L., B.Sc.	1906	1019 Bute St., Vancouver, B.C.
Speirs, T. B., B.Sc.	1909	Appleton, Ont.
Squire, A. M., B.Sc.	1909	L. S. & M. S. Ry., Cleveland, O.
Squire, R. L., B.Sc.	1904	Assistant Engineer, Ottawa.
Stanley, J. N., M.A., B.Sc.	1908	Port Colborne.
Stevens, F. G., B.Sc., M.E.	1901	McKeevers Bros., Etzatlan, Jalisco, Mexico.
Stidwill, F., B.Sc.	1908	Cornwall.
Stiles, L. P., B.Sc.	1907	11508 Detroit St., Cleveland, O.
Stilwell, A. J., B.Sc.	1902	355 Dearborn St., Chicago, Ill.
Stott, J., B.Sc.	1908	Keary St., Sapperton, B.C.
Strachan, B. O., B.Sc., M.E.	1905	Oliver Mining Co., Ely, Minn.
Sutherland, T. F., B.Sc.	1904	Prince Rupert, B.C.
Sutherland, E., B.Sc.	1902	Cardinal.
Sweezey, R. O., B.Sc.	1908	Quebec, Que.
Tett, B., B.Sc.	1904	Can. Iron Corporation, Bathurst, N.B.

Thornton, L. A., B.A., B.Sc.	1906	Dept. of Public Works, Regina, Sask.
Thompson, A. T., B.Sc.	1904	
Timm, W. B., B.Sc.	1906	Apartado 33, Guanajuato, Mexico.
Trueman, J. D., B.Sc.	1908	Dept. of Geol., Univ. of Wisconsin, Madison, Wis.
Twitchell, K. S., B.Sc.	1908	De Lamar, Idaho.
Walker, H., B.Sc.	1904	Cornwall, Ont.
Walker, Thomas L., M.A.	1890	Professor of Mineralogy, Toronto University, Toronto.
Way, W. C., B.Sc., 1905, M.Sc.	1906	Lecturer, School of Mining, Kingston.
Webster, A. R., B.Sc.	1904	Maisonneuve, Que.
Wells, J. Walter, B.Sc.	1898	192 Shuter St., Toronto.
White, H. T., B.Sc.	1909	Stratford.
Wilgar, W. P., B.Sc.	1903	Divis. Engineer, Transcontinental Ry., Nepigon, Ont.
Williams, M. Y., B.Sc.	1909	R.R. No. 1, Picton.
Williams, T. B., B.Sc.	1909	Coleman, Alta.
Woods, S. A., B.Sc.	1909	Tamworth, Ont.
Woolsey, W. J., B.Sc.	1907	Thetford, Que.
Workman, C. W., B.Sc.	1903	Mining Engineer, Amparo Mining Co., Etzatlan, Jalisco, Mexico.
Workman, J. K., B.Sc.	1904	Copper Cliff.
Wright, A., B.Sc.	1905	Ont. Iron & Steel Co., Welland, Ont.
Wright, G. C., B.Sc.	1907	T. & N. O. Ry., North Bay, Ont.

LIST OF STUDENTS.

Session 1909-'10.

FIRST YEAR.

Name.	Address.
Acton, M. M.	Gananoque, Ont.
Ahern, F. X.	Quebec, Que.
Allan, F. M.	Ottawa.
Alyea, O.	Trenton, Ont.
Amey, P. G.	Camden East, Ont.
Anderson, A. K.	Goderich, Ont.
Anderson, H. M.	Dundas, Ont.
Asselstine, R. M.	Collins Bay, Ont.
Aykroyd, M. J.	Edmonton, Alta.
Bell, B. C.	Cobourg, Ont.
Bell, E. P.	St. Louis, Mo., U.S.
Bell, J. W.	Toronto.
Bell, W. G.	Toronto.
Benger, F. W. A.	Port Arthur, Ont.
Bews, D. W.	Gananoque, Ont.
Black, H. F. B.	Kingston.
Blackeby, E. M.	Kingston.
Braun, E. F.	New York, N.Y.
Browne, E. F.	Ottawa.
Browne, E. F.	Ottawa.
Buskard, C. H.	Belleville, Ont.
Byers, D. P.	Gananoque.
Cameron, R. M.	New Liskeard.
Clarke, R. F.	Woodstock, Ont.
Coates, C. P.	Victoria, B.C.
Connelly, L. P.	Ottawa.
Cooke, H. W.	Kingston.
Cook, W. S.	Ottawa.
Corrigan, A. C.	Kingston.
Coughlin, J.	Toronto.
Cram, R. M.	Smith's Falls, Ont.
Crawford, J. W.	Kingston.
Cross, J. G.	Port Arthur, Ont.
Dalziel, W.	Georgetown, P.E.I.
Dawson, W. L.	Ottawa.
Dick, H. S.	Kingston.
Dickson, L. H.	Kingston.
Dorus, H. J.	Bridgeport, Conn.
Doyle, A. J.	Kingston.
Dunlop, H. J.	Grones Point, N.S.
Eaton, H. T.	Carlisle, Ont.

Name.	Address.
Elliott, W. J.	Agincourt, Ont.
Fairlie, W. A.	Kingston.
Fielding, C. H.	Hamilton.
Fulcher, E. J.	Sault Ste. Marie, W.
Gardner, J. D.	Ottawa.
Gelineau, E. E.	Lowell, Mass.
Gibson, J. N.	Kingston.
Grant, C. G.	Woodstock, N.B.
Gray, S.	Osborne, Ont.
Greenland, C. W.	Port Arthur, Ont.
Hambly, G. H.	Belleville, Ont.
Hardie, W. E. G.	Lethbridge, Alta.
Harkness, H. W.	Cornwall, Ont.
Harkness, R. D.	Cornwall, Ont.
Hemphill, M. P.	Toronto.
Herridge, G. B.	Ottawa.
Hinton, R. E.	Gananoque, Ont.
Ireland, S. K.	Stratford, Ont.
Jemmett, D. M.	Napanee, Ont.
Johnston, W. M.	Stamford, Ont.
Kane, W. L.	Kingston.
Foley, C. J.	Lansdowne, Ont.
Laidlaw, C.	Kingsmill, Ont.
Laidlaw, Clinton	Kingsmill, Ont.
Laing, W. S.	Peterborough, Ont.
Latŭrney, F. F.	Kingston.
Laurie, S. M.	Hamilton, Ont.
Lawson, E. O.	Copper Cliff, Ont.
Lawson, L. A.	Copper Cliff, Ont.
Lindsay, D. M.	Quebec, Que.
Lumb, W. E.	N. Battleford, Sask.
Manhard, W. E.	Kingston.
Markle, G. A.	Toronto.
Martin, E. A.	Sudbury, Ont.
Matheson, H.	Parkhill, Ont.
Matthews, H. E.	Trenton, Ont.
Meek, R. L.	Kingston.
Melrose, T. M.	Coaticooke, Que.
Montgomery, C.	Winnipeg, Man.
Morgan, W.	Rossland, B.C.
McGillivray, C. A.	Vancouver, B.C.
MacKay, W. J. K.	Renfrew, Ont.
McKenzie, C. S.	Portage la Prairie, Man.
McKiel, H. W.	Guelph, Ont.
McLean, C. D.	Dutton, Ont.

Name.	Address.
MacLean, M.	Kingston.
MacLeod, G. W.	Sherbrooke, Que.
Macnee, W. K.	Kingston.
McNeice, L. G.	Reay, Ont.
Nelson, C. H.	Toronto.
Offord, C. G.	Kingston.
Pound, J. F.	Kingston.
Reid, G. J.	Kingston.
Rice, G. T.	Baddeck, C.B.
Robbins, C. A.	Norwich, Ont.
Roberts, O. B.	Murray Harbour, P.E.I.
Robinson, C.	Kingston.
Rogers, H. D.	Gananoque, Ont.
Sawyer, E. P.	Montreal, Que.
Shirley, E. R. (B.A.)	St. Andrew's, N.B.
Sirett, E. J.	Rosseau, Ont.
Skinner, H. L.	Kingston.
Smail, H. A.	Spencerville, Ont.
Smeltzer, J. H.	
Smith, R. M.	Kingston.
Smith, W. N.	Sudbury, Ont.
Spence, L. H. B.	Toronto.
Sterne, E. T.	Brantford, Ont.
Stevenson, J.	Bath, Ont.
Suter, F. J.	Dundas, Ont.
Taylor, L. G.	Mount Elgin, Ont.
Tobey, F.	Memphis, Tenn.
Wallace, J.	Bridgeport, Conn.
Warwick, W. J.	Smith's Falls, Ont.
Weese, S. D.	Bath, Ont.
Wells, W. A.	Tamworth, Ont.
White, W. F.	Petrel, Man.
Wight, E. J.	Ottawa.
Wilkins, C. H.	Baysville, Ont.
Wilson, R. R.	Toronto.

SECOND YEAR.

Name.	Address.	Course.
Aldersno, W. P.	Sault Ste. Marie.	Mining.
Armstrong, L. N.	Kingston	Civil.
Armstrong, W. E.	Moulinette, Ont.	Mineralogy & Geology.
Attwood, C. H.	Kingston	Civil.
Asselstine, C. V.	Wilton, Ont.	Electrical.
Barton, A.	Dennent, Ont.	Mining.
Bate, A. C.	Ottawa	Mining.
Bayne, G. M.	Kingston	Electrical.

Name.	Address.	Course.
Beer, H. L.	Charlottetown, P.E.I.	Mining.
Bertram, A. S.	Dundas	Mechanical.
Bolton, G. E.	Perth, Ont.	Mining.
Burdekin, R. W.	Bovina Cen., Del. Co., N.Y.	Electrical.
Burrows, M.	Nelson, B.C.	Chemistry & Mineralogy.
Cameron, W. G.	Exhibit'n Park, Toronto	Civil.
Cantelo, R. C.	St. Thomas	Civil.
Carmichael, A. D.	Wigwam, Ont.	Mining.
Caton, W. C.	Rossland, B.C.	Mining.
Chown, R. D.	Kingston	Mechanical.
Cook, W. E.	Kingston	Mining.
Dawson, S. G.	Ottawa	Mining.
Donoghue, W. B.	Burritt's Rapids, Ont.	Mining.
Doyle, C. J.	Kingston	Electrical.
Elliott, C. F.	Nelson, B.C.	Mining.
Erskine, J.	Kingston	Civil.
Fairbairn, H. P.	Newburgh, Ont.	Electrical.
Fitzgerald, C. C.	Parry Sound, Ont.	Power Development.
Freeman, C. H.	Kingston	Civil.
Gibson, E. P.	Willowdale, Ont.	Civil.
Goodwin, E. L.	Kingston	Mining.
Goodwin, G.	Ottawa	Chemistry & Mineralogy.
Gow, D. B.	Calgary, Alta.	Power Development.
Gray, A. W.	Kingston	Civil.
Griesbach, W. C.	Collingwood	Civil.
Haffner, A. B.	Kingston	Electrical.
Harding, W. D.	Gowganda, Ont.	Mining.
Harvey, J. P.	Vermilion, Alta.	Civil.
Howell, G. E.	Hamilton	Civil.
Hughes, L. M.	Kingston	Civil.
Huyck, C. B.	Tweed, Ont.	Mining.
Johnson, J. H.	Cottam, Ont.	Mining.
Kemp, M. A.	Westboro, Ont.	Civil.
Kendall, L. E.	Ottawa	Power Development.
Kinnear, L. A.	Port Colborne	Mining.
Lamson, B.	Vermontville, N.Y.	Civil.
LaRush, R. J.	Kingston	Electrical.
Leckie, N. E.	Hamilton	Mining.
Lewis, A. L.	Hamilton	Mining.
Lloyd, G. H.	Cobalt	Mining.
Longmore, E. L.	Regina	Mining.
Losee, W. H.	Collins Bay	Mining.
Medlen, E. M.	Hamilton	Mining.
Meikle, A. U.	Kingston	Civil.
Meikle, M.	Kingston	Mining.

Name.	Address.	Course.
Mills, L. S.	Renfrew	Mining.
McAuliff, F. P.	Welland	Electrical.
McCann, W. S.	Kingston	Mineralogy & Geology.
Macdonell, F. H.	Cornwall	Mining.
MacGregor, S. E.	Helen Mine, Ont.	Mining.
MacKay, J. I.	Cornwall	Mining.
McKenzie, J. E.	Calgary	Civil.
McLaren, A. G.	Ashton	Civil.
McLean, J. G.	St. Thomas	Mineralogy & Geology.
Macleod, D. K.	Montreal	Electrical.
McNicol, J. A.	Winnipeg	Civil.
Norrish, W. H.	Guelph	Power Development.
Pierce, C. B.	Kingston	Civil.
Poitras, L. C.	Quebec	Mining
Prittie, L. C.	Pembroke	Mining.
Robertson, J. A. T.	St. Catharines	Mining.
Robinson, S. D.	Kingston	Mining.
Scott, J. M.	Dublin, Ont.	Mining.
Sharman, H. J.	Kingston	Electrical.
Singleton, J. M.	Soperton, Ont.	Electrical.
Sirvage, E. G.	Chesterville, Ont.	Civil.
Skinner, P. E.	Keene, Ont.	Electrical.
Smith, W. A.	Chesley	Mining.
Smyth, E. S.	Berlin, Ont.	Civil.
Stack, J. I.	Lyn, Ont.	Mechanical.
Stevens, C.	Kingston	Civil.
Taylor, G. S.	Arnprior, Ont.	Mining.
Trimble, L. V.	Napanee	Electrical.
Waldner, E. F.	St. Eureka, Cal.	Mining.
Wardle, J. M.	Hope, B.C.	Civil.
Watson, R. R.	Cornwall	Mining.
Watts, E. C.	Moose Creek, Ont.	Mining.
Wigle, E. R.	Kingsville, Ont.	Mining.
Wilson, E. E.	Hamilton	Civil.

THIRD YEAR.

Adams, L. B.	Wales, Ont.	Mining.
Anglin, D. G.	Kingston	Mining.
Armstrong, W. B.	Caledonia, Ont.	Power Development.
Asselstine, B.	Belleville, Ont.	Mining.
Bartlett, R.	Kingston	Mining.
Bennett, J.	Kingston	Electrical.
Borden, P. A.	Pugwash, N.S.	Electrical.
Bothwell, N. D.	Rossland, B.C.	Mining.
Bourgoing, S.	Tadoussac, Que.	Civil.
Bradley, H.	Kingston	Mining.

Name.	Address.	Course.
Brewster, J. A.	Victoria, B.C.	Electrical.
Brown, R. W.	Saskatoon, Sask.	Electrical.
Burroughs, C. W.	Kingston	Mech. & Electrical.
Cameron, G.	Waterdown, Ont.	Electrical.
Carscallen, H. A.	Enterprise	Electrical.
Caverhill, A. J.	Vanneck, Ont.	Electrical.
Davis, N. B.	Kingston	Chemistry & Mineralogy.
Doncaster, P. E.	Orono	Power Development.
Earle, W. S.	Picton, Ont.	Civil.
Elliott, R. A.	Calgary, Alta.	Mining.
Gates, A. B.	Kingston	Electrical.
George, W. B.	Eganville, Ont.	Mining.
Goodwin, W. M.	Kingston	Mining.
Hughson, W. G.	Niagara Falls, Ont.	Mining.
Hutchison, R. H.	Rossland, B.C.	Mining.
Kirkpatrick, A. K. M.	Kingston	Civil.
Lawler, A. P.	Kingston	Electrical.
Malloch, N.	Arnprior, Ont.	Civil.
Marshall, J. R.	Ottawa	Mineralogy & Geology.
Mills, T. S.	Kingston	Civil.
Moran, P. J.	Kingston	Mining.
Morgan, A. L.	Truro, N.S.	Power Development.
Moyer, J. H.	St. Catharines	Civil.
McDougall, B. W. W.	Lancaster	Mining.
McLaren, A. A.	Mitchell, Ont.	Civil.
McPherson, J. C. R.	Woodstock	Mining.
MacRostie, N. B.	Saskatoon, Sask.	Civil.
Newman, W. A.	Kingston	Mechanical.
Palmer, R. N.	Norwich, Ont.	Mining.
Phillips, H. L.	Cornwall, Ont.	Civil.
Ramsay, J. H.	Ottawa, Ont.	Power Development.
Reid, T. J.	Williamsville	Mining.
Rogers, R. A.	Gananoque, Ont.	Mining.
Rooney, J. T.	Quebec, Que.	Mining.
Scovil, S. S.	Kenora, Ont.	Electrical.
Slipper, S.	Port Arthur, Ont.	Mineralogy & Geology.
Stewart, J. S.	Renfrew, Ont.	Chemistry & Mineralogy.
Stirling, J. B.	Scott, Sask.	Civil.
Stewart, W. G.	Waba, Ont.	Electrical.
Thomas, A. S.	Kingston	Civil.
Tremblay, J. A.	Charlevoix, Que.	Civil.
Tuckett, W. H.	Bath, Ont.	Mining.
Uglow, W. L.	Kingston	Mineralogy & Geology.
Wright, L. E.	Conway, Ont.	Mining.

Name.	Address.	Course.

FOURTH YEAR.

Arthur, A. J.	Ottawa	Electrical.
Bateman, A. E.	Kingston	Mining.
Battersby, W. F.	Kingston	Mining.
Bell, F. A.	St. Thomas, Ont.	Civil.
Bell, W. A.	St. Thomas, Ont.	Mineralogy & Geology.
Bertram, H. G.	Dundas, Ont.	Mechanical.
Birkett, E. H.	Kingston	Mining.
Butler, S. H.	Loreburn, Sask.	Electrical.
Callander, R.	Kingston	Civil.
Crawford, V. W.	Kingston	Electrical.
Clarke, K. S.	Woodstock	Chemical.
Dobson, J. V.	Picton, Ont.	Electrical.
Drewry, G. F.	Stirling, Ont.	Electrical.
Ellis, D. S.	Kingston	Civil.
Ewart, M.	Medicine Hat. Alta.	Civil.
Fletcher, W. J.	Fletcher, Ont.	Civil.
Frost, E. S.	Pembroke	Electrical.
Gallagher, O. G.	Ottawa.	Mining.
Gillette, O.	Kingston	Mining.
Goedike, F. B.	West Toronto	Civil.
Hambly, W. R.	Napanee	Sanitary.
Holland, A. A.	Haileybury	Mining.
Johnston, P. K.	Cleveland, Ohio	Civil.
Keeley, D. E.	Railton, Ont.	Mining.
Madden, M. S.	Napanee, Ont.	Electrical.
Malloch, E. S.	Hamilton, Ont.	Electrical.
Mateer, T. J.	Kingston	Mining.
Morrison, W. M.	Maxville, Ont.	Mining.
McEachern, J. J.	Gravenhurst	Mining.
MacKay, A. A.	Scotstown, Que.	Mining.
Mackenzie, R. M.	Eganville, Ont.	Electrical.
Neilson, L. R.	Stella, Ont.	Civil.
Newlands, N.	Kingston	Civil.
Ockley, R. F.	Montreal	Electrical.
Orser, E. H.	Kingston	Mining.
Rose, J. H.	Winchester, Ont.	Mining.
Scott, W. R.	Napanee	Electrical.
Simmons, G. A.	Simmons, Que.	Sanitary.
Spearman, C.	Stittsville, Ont.	Mining.
Stanley, J. L.	Port Colborne, Ont.	Mechanical.
Stanley, O.	Edmonton, Alta.	Civil.
Williams, K. F. A.	Kingston	Electrical.
Young, J. H.	Almonte, Ont.	Electrical.

POST-GRADUATE.

Norrish, B. E., B.Sc.....Walkerton, Ont.
Agassiz, W. G. S., B.Sc...Kingston, Ont. .....Geology.

SPECIAL COURSE.

Name.	Address.
George, G. A.	Eganville, Ont.
Nichols, D. A.	Kingston, Ont.
Shaver, P. A.	Calgary, Alta., 518 5th Ave., W.

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